RAILROAD GAZETTE

FRIDAY, JULY 24, 1903.

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The Engineman's Whistle Signals.

Boston, July 20, 1903.

TO THE EDITOR OF THE RAILROAD GAZETTE:

"Slovenliness in giving whistle and hand signals indicates the mental habit of a locomotive engineer, or other trainman." This, in substance, appears in an article by Mr. A. J. Love in your issue of July 17, and is significant. It is not news; but it is an old and neglected truth. Many writers and speakers expatiate on the high class of men needed to run a locomotive; on the need of good physique, good nerves, well balanced mind, quick wit, and so on; and yet in appointing men to fill this position the pernicious seniority rule prevents due weight being given to these essential qualifications. If a freight runner pleases the superintendent by making good time, and satisfies the mechanical department by taking good care of the engines that he runs; and if he has no bad accidents; he is promoted to a passenger run when his turn comes, no matter whether he would rate 95 per cent., or down to 70 per cent., or 50 per cent., in the physical and mental qualifications just mentioned. If his clear record is two-thirds due to good luck, he is set up all the same. Pooling of locomotives has made neglectful practice so common that even the master mechanics themselves have unconsciously lowered their standards; and the finest class of men, the kind that we used to boast of, is now such a small class that there are scarcely enough in it to man the officers' trains and the limited expresses. On one of these extra-nice limited trains recently I rode 200 miles behind two enginemen (one succeeding the other) neither of whom could whistle for highway crossings in a decent manner. If an engineer cannot make a ——— — - - he lacks an important element of native ability, or else needs training in the primary school of railroading. If he will not—if his careless habit is due to persistent disinclination to obey orders in what he calls small things—he lacks an important moral element. Mr. Charles Hawksley in his address when he retired recently from the presidency of the (English) Institution of Civil Engineers, recommended that prizes be given to young civil engineers for adding beauty of form to their designs; that engineers who most successfully combined beauty with utility should be recognized and pointed out. This principle applies in train-running as well as in making bridges or buildings. To please people of taste who ride in parlor cars, the railroads spend many thousands of dollars; but the money goes mostly to please the eye. The railroad's accomplice in extravagance, the Pullman Company, spends other thousands, some of which goes to shut out a part, but not a large part, of the annoyance of unpleasant sounds. Why not teach enginemen to civilize the noises that they must make?

There is another grade of slovenly whistling; that which is observable among runners who know better, but who think, like many motormen of electric cars, that it is proper to modify the sounds that they make (as an organist does the notes of his music, to produce variations) in order to "demonstrate his cheerfulness," as one reporter has phrased it. Running the engine of a fast train is a serious, strenuous business. The runner who can properly attend to his engine and his signals and at the same time be playing a flute, is somewhat exceptional; or, at any rate, the burden of proof is on him to show that his work is first in his mind, and the divertisement second. The alert superintendent or trainmaster not only wants his runners to be strictly attentive to duty; he desires that everything that they do, which can be seen, heard, smelt or felt by others, shall give evidence of this attentiveness; or, at all events, shall give no evidence to the contrary. Passengers should demand, and superintendents should insist, that each engine runner make passengers' journeys pleasant, as a demonstration that he is competent to make their journey safe.

F. D. S.

The Distant Signal.

London, July 1, 1903.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I regret that amongst other interesting matters I had not opportunity of referring more fully to the use of the distant signal at the meeting of the Railway Signaling Club held in New York on March 10 last, which meeting, by the way, I much enjoyed. I am thankful that I had such an admirable opportunity of meeting so many of my signaling brethren and am grateful to them for the kind consideration they showed to me. Taking as my text the admirable paper by Mr. W. H. Elliott read before the club on Nov. 11 last (*Railroad Gazette* Nov. 7) I would offer some comments on distant signal practice in America and England. The distant signal is an established institution in Great Britain, as no doubt in time it will become in America. We have distant signals everywhere not only in thin districts, but where signals are close together, and except in very few cases each tower has its own distant signal no matter how short the sections are.

All British distant signals are worked by wire and are never worked by rodding or by power except in the few cases of power plants. Nor are the signals operated by a return wire but by a single wire going from the lever in the locking frame to the signal, where there is provided a weight on the balance lever sufficiently heavy to put the signal to danger and bring back the wire when the signal is released. The wire generally used is seven strands No. 15 steel. Some companies still use a No. 10 single iron wire, but very little single or iron wire is used. It is carried through galvanized iron pulleys fixed on wooden pegs 30 ft. apart. The pulleys are about 1¾ in. diameter.

The greater part of the distant signals are fixed on the posts of stop signals for the tower of the next section in the rear. When it is remembered how close together are the towns and villages in England this is surprising. When such a distant signal is fixed on the advance or starting signal of the tower in the rear and it is not then the full regulation distance from its own home signal, it is customary to repeat the distant arm also on the home signal at the tower in the rear. This distant signal is known as the "outer distant" and the other, i.e., the one on the starting or advance signal—as the "inner distant."

It was the custom at one time in Great Britain in such cases, where a distant signal had to be fixed on a signal at the tower in the rear, to only put it on the home signal and not on the advance or starting signal. Consequently after passing a home signal and doing some work the trainmen when they started again and passed the advance signal were not aware of the state of affairs ahead, as possibly since they passed the home signal the distant (then perhaps in the "on" position) might have been cleared or vice versa.

In all cases where distant signals are lower arms on stop signals, the upper arm always "slots" (controls) the lower arm. This slotting of signals is carried very far in British signaling, not so much for the purpose of reducing the number of signals to be provided but in order to avoid the presentation of ambiguous or contradictory signals to an engineer. In Fig. 1 is shown a case where the slotting of signals is peculiar and yet very necessary.

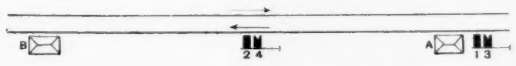


Fig. 1.

A and B are two towers. Signal 1 is the home for A and signal 2 the advance signal. Signals 3 and 4 are respectively the outer and inner distants for tower B. The peculiar conditions in this case are that distant arm 3 would also be slotted by advance signal 2 as well as by its upper arm 1. The reason for this is as follows. Let it be imagined that tower B is closed at certain times but A is always open. When the towerman leaves B he will pull off his signals, and amongst them will be distants 3 and 4. The arms themselves will remain "on" so long as the upper arms are at danger owing to the slotting apparatus. Let it then be further imagined that a train is approaching A, which train the towerman at A wishes to hold at the advance signal 2. According to the block rules in England the towerman would keep his home signal at danger until the train had almost come to a stand and he would then lower the signal for the train to draw forward to the advance. Except for the slot the distant 3 would fall too when the home signal came "off," and this, seeing that the advance 4 was on, would be a conflicting signal. Therefore it is the practice to "slot" distant 3 by the upper arm and by the advance signal also.

There is a great difference between American and British practice as to the distance the distant signal is placed from the home signal. Here the average distance is 2,400 ft., but I myself have had in my charge five signals a mile (5,280 ft.) from the tower. These were worked by single wire in the usual way, and no difficulty whatever has been experienced in working signals at such a length from the tower. This is different from American practice, as I gather from remarks made by Messrs. Rosenberg, Mock, Dunham and Grafton that difficulty is experienced in working by ordinary means signals only from 1,200 to 3,000 ft. from the tower.

No explanation is given by these gentlemen as to the reason for this difference, but I assume it may be ascribed to the greater extremes to which the temperature varies. This upsets all adjustment of signal wires. The practice, too, of working signals by return wires tends to hard working and complication. I know the single wire method has been tried and failed, but I would suggest that a further effort be made. Proper attention must be paid to the connections, which should be well put in. I recognize also an advantage in the double wire arrangement in insuring that the signal obeys the lever more readily; but this, I submit, can be met by the provision of electrical repeaters.

Variations in temperature bring up the question of compensation. I have had a varied experience of (so-called) compensators and I have not yet met with a perfect one. It is possible to automatically adjust signal wires when the lever in the locking frame is normal, but not so readily to adjust it when the signal is "off." Consequently when a tower is closed at night or on Sundays, the wire expands and the signal goes to danger (so becoming a nuisance, if not worse), or the wire contracts to such an extent that something has to give way. A popular form of compensator is that fixed midway in the run of the wire with weights to keep the wire taut, but here provision has to be made so that if the wire breaks between the compensator and the tower the weights of the compensator shall not pull off the signal. This is generally met by some emergency contrivance which when required fails to act because it has become rusty or dirty. What I have done and what is done by most British railroad companies is to provide some ready means of adjustment on the signal lever in the tower whereby the towerman can himself adjust the signal wires as he may find necessary, and this without leaving the tower.

Electrical repeaters are extensively used in Great Britain, and I suppose quite 50 per cent. of our distant signals are provided with repeaters. The instruments generally give three indications, "On," "Off" and a "Wrong" position, the latter appearing when a signal has either failed to go fully to danger or has not come properly off. These instruments are provided for all signals, distants or otherwise, that cannot be seen from the tower; but some English companies have gone further and provided them for all distant signals. The instruments are placed over the lever working the signal so that the towerman can at once see whether or not his work is properly done. He can also see when the signal wires require adjustment. Of course if you cannot get men to watch the instruments it is a waste of money to provide them; but by fixing them over the levers to which they are applicable, the men cannot but observe their working. The cost of these instruments in England is lower than the figures given by Mr. Elliott. They are provided for about $40 and are maintained for about $7.50. It may be that these lower figures are due to the fact that in Great Britain the batteries are fixed at the signal and only a single and not a double wire is necessary for the current. If my American friends find that repeaters can be provided and kept in repair for anything like these figures probably a more extended use of them may result.

In Great Britain indicators are also provided for showing at night whether or not the light is burning. These are not used by all the companies but no doubt their provision is wise. Those companies who do not provide them quote as an argument for not doing so the rule that a signal not properly exhibited is to be treated as a danger signal.

Having regard to the long distances from towers that distant signals are now fixed, and the complications necessarily arising from the controls exercised over them from other towers I look with decided favor upon the American practice of working such signals by power; and I am hoping for good results from those signals on the North Eastern of England that the Hall Signal Co. purposes providing with its electro-gas mechanism. These signals will be put on and off by means of an electric control attached to the lever in the locking frame. With this apparatus the signals are bound to come off to the right angle and no question of adjustment can arise.

As I stated at the meeting of the Signaling Club already referred to, America is ahead of Great Britain in one respect, and that is in the distinction of the distant signal. We, of course, have the fish-tail arm, but our arms are painted red and our lights are red for "on" and green for "off," the same as for a stop signal. I do not think it is likely that anything will be done with regard to the color of the arm, but experiments have been made as to amending the light. One remedy tried, but not successfully, is with a lamp similar to that designed by Mr. Carter, of the Chicago & North Western. Trials

have also been made with Nels yellow signal glass or something similar. That also has been condemned, but I am not satisfied with the reasons given for the reported non-success. It has been stated that the color could not be distinguished more than 750 ft. away. But is not that enough? It is not a stop signal, and with only 750 ft. clear view it gives—according to British practice—over 3,000 ft. in which an engineer has to pull up. But may we not claim more than 750 ft.? A yellow light can only be confused with a red or a white light, certainly not with a green. Either of the two first mentioned lights are danger indications, and if an engineer sees what is a yellow light but cannot clearly make out its actual color—whether red, white or yellow—he should know that it indicates that the signal is on and should be preparing to stop. The only possible objection in my mind to a yellow light is the remote contingency of an engineer seeing a yellow light and pulling up under the impression that it is the red light of a stop signal. But even if he does this no harm is done, it only means a slight delay, and, as I have said, such a contingency is most remote and would be a rarer event than what might happen under existing conditions when an engineer might still more readily take the red light of a distant signal as the danger position of a stop signal. Altogether then I regard the objections put forth against a yellow light for the "on" position of a distant signal as rather overdrawn, and I am hoping that my English friends will see their way to pursue their investigations in that direction further.

At all junctions in Great Britain splitting distant signals are provided to indicate to an engineer what road is set up. This is not, however, always done at those junctions where trains are turned from a high speed to a slow track. Most companies prefer to interlock the distant signal so that it cannot be lowered if the road is set for diverging on to a slow track. By this they compel an engineer to pull up. It is, however, questionable to my mind whether this is the proper course to take; and in saying this I am making a confession and going back on my own words; as up to within the last two years I have preached a gospel that I am not now prepared to back up. I question very much whether it is not better to tell an engineer beforehand what road is set up, and put on him the responsibility of knowing the conditions ahead and regulating his speed so as to go smoothly through the crossing from fast to slow. I do not believe in this practice of keeping signals at danger and so training men to always find the distant at danger and the stop signal "off." It is bound sooner or later to lead to a man some day finding the stop signal on when he expected to find it off, and therefore I am inclined to advocate the provision of a distant signal for each home signal, and put on the engineer the onus of regulating his speed to suit the conditions.

H. RAYNAR WILSON.

The Norfolk & Western Railway.

BY GEORGE L. FOWLER.

Terminal Facilities.

In the previous article (*Railroad Gazette*, p. 483,) dealing with the Norfolk & Western Ry. there was given a review of the general physical condition of the road and the methods of handling the traffic. With connections at Bristol, Hagerstown, Md.; Winston-Salem, N. C.; Durham, N. C., and Norton, Va., there must necessarily be terminal facilities at each of these points, but they are more of the character of interchange points than true terminals, of which there are, in reality, three upon the road, located at Columbus, Cincinnati and Norfolk.

Of these three main terminals of the road that at Columbus is the least interesting and has no novel features, if the single one of being the only road entering the city that can make its own deliveries to all connecting lines be excepted. On approaching this city from the south the line first crosses the Hocking Valley about ten miles out. At eight miles it connects with the Toledo & Ohio Central. It then passes north skirting the eastern limits of the city line and connects with the Pittsburgh, Cincinnati, Chicago & St. Louis R. R., and the Baltimore & Ohio. Before reaching these connections, it sends out a branch known as the Columbus Connecting & Terminal R. R., which is a belt line owned by the Norfolk & Western by means of which access is gained to the tracks of the Union Passenger Station and to its own freight depot on Mt. Vernon avenue, and which has junctions with the Cleveland, Akron & Columbus, the Columbus, Sandusky & Hocking, and the Big Four. Its own sorting yard is outside the city beyond the junction with the Cleveland, Akron & Columbus R. R., and here incoming trains are broken up for delivery to the various connections, and out-going trains made up.

At Cincinnati the same conditions exist, and here, too, the Norfolk & Western is in possession of the Belt Line over which transfer work is done. At present, however, the facilities are inadequate to handle the traffic with satisfaction to the management, and work is in progress to increase them.

As matters now stand there is a comparatively small yard at Newtown ten miles from the city passenger station at Court street. At Clare, one mile nearer, there is also a small yard. At the latter point a connection is made with the Pittsburgh, Cincinnati, Chicago & St. Louis R. R., over whose rails the through passenger trains are run to the Pearl and Butler street station.

The handling of the freight traffic over the grades between Clare and Idlewild is conducted by switching service. At Idlewild there is a junction with the Cincinnati, Lebanon & Northern R. R. The Belt Line runs off to the north and forms a loop serving the large industrial properties in and about the suburb of Ivorydale, and also making connections with the Baltimore & Ohio Southwestern, the Cincinnati, Hamilton & Dayton and the Big Four. This Belt Line contains some important engineering work. The high lands back of the river front at Cincinnati are very irregular, and the carrying of a line through this territory has involved the construction of one trestle 1,380 ft. long, a portion having a height of 60 ft. At one point the track crosses the Big Four yard on a through bridge carried by steel piers and having a span of 123 ft. At one end of the trestle the track crosses the Miami and Erie Canal on a short draw. The trestle itself is of wood and will be converted to a fill when the time for reconstruction arrives.

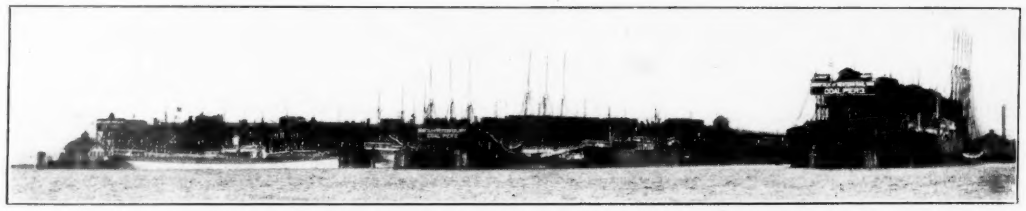
In the handling of freight traffic over this line, the trains are broken up at Newtown and cars intended for the Cincinnati terminal at Court street, those for delivery to the Pan Handle and those for the industrial establishments on the Belt Line are delivered to their destination by switching service.

The improvements that will be made for this terminus will be the construction of an ample receiving and forwarding yard with a division roundhouse at Clare. The road engines will then haul their trains to this point, where the latter will be broken up and arranged for proper distribution to connections and the industrial establishments on the Belt Line. This will relieve the yard at Idlewild, which is small and with no possibilities of extension, where the work is now necessarily done to a great extent. All outgoing freight will be sent directly to the Clare yard, where it will be switched into trains and sent out. It is expected that this yard will greatly facilitate all Cincinnati traffic and prevent the possibility of congestion at any point on the Belt Line or within the city limits.

There is one structure in connection with the Cincinnati terminal that is deserving of a passing notice. It is the coal wharf at the Court street station for the storage and delivery of the Pocahontas and Thacker fields coal directly to the wagons for city delivery. The Norfolk & Western trains leave the Court street station via the Cincinnati, Lebanon & Northern, under trackage rights to Idlewild. A short distance from Court street station a spur of the Norfolk & Western is run out on the coal wharves shown in the accompanying illustration. In the Pocahontas section there are 30 pockets, and in the Thacker 16, each capable of holding 45 tons. When drawing off into the wagons, the coal runs over a grating through which the slack falls, while nothing but lump is delivered for household use. The slack is afterwards sold for steam purposes. This wharf makes it possible for coal coming in by rail to compete with the cheaper grades coming down the Ohio by boat from Pittsburg.

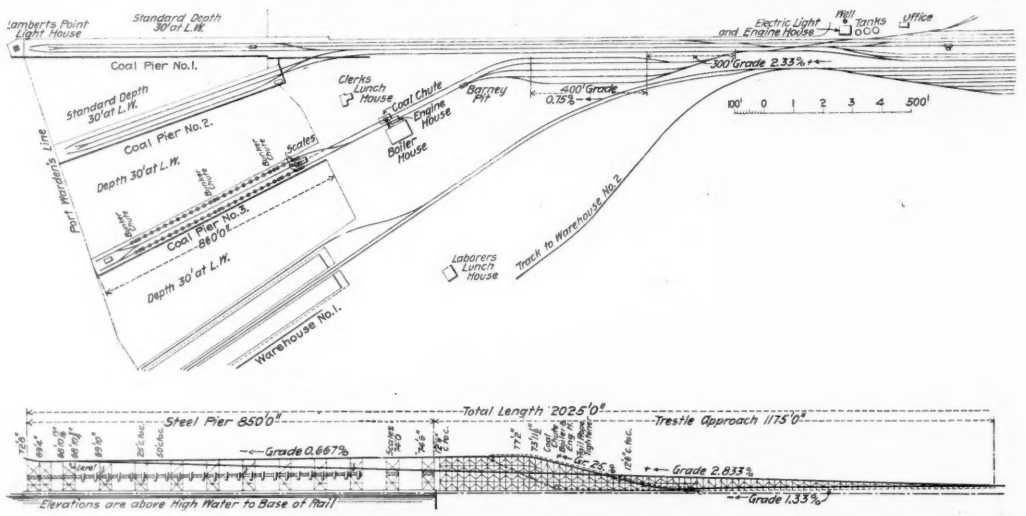
The company's other terminal at Norfolk also has extensive coal wharves which are located at Lambert's Point for delivery of Pocahontas coal to vessels lying alongside. They are three in number. The first that was built is a wooden trestle, the second is of steel. In both of these the cars are pushed to the top of the incline by a locomotive, and are then dropped down by gravity to the chutes where they are discharged into hoppers; whence the coal is drawn into the vessels. The cars then drop down over a switchback to the surface of the yard.

The third and last wharf that has been built is of steel and is shown in the accompanying illustrations. The reproduction of the photograph shows the general appearance with a car part way up the incline. The cars are set down into a four track gravity yard by the switching



Coal Wharves, Norfolk, Va., Norfolk & Western Railway.

Coal Pier, Norfolk, Va., Norfolk & Western Railway.



Coal Piers, Norfolk, Va., Norfolk & Western Railway.

engine, whence they are dropped down one at a time to the foot of the incline. Here there is a barney car moved by a cable which can be dropped down into a pit between the main rails to permit the passage of a car. As soon as the car reaches the foot of the incline, the push car is brought up against the rear drawbar and the car is raised to the top. Here it runs upon a gravity incline, passes on the scales, where it is automatically weighed by the Streeter-Amet automatic weight recorder. It then runs down the chutes where it is emptied, and thence on the switchback at the outer end of the wharf. It comes back by gravity over a central track and out upon the yard.

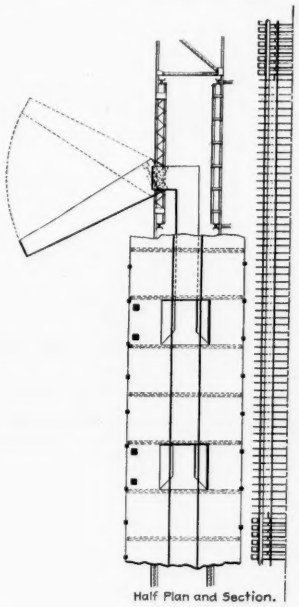
A great saving in switching service is effected by this structure. All that is required of the yard engines is to push the cars in upon the gravity yard delivering to the foot of the incline, and to haul away the empties when they have reached the foot of the switchback track. The speed with which the cars can be handled is about one every three minutes, or 20 an hour. This is, however, at times somewhat faster than the coal can be taken care of, stowed and trimmed in the vessels so that the actual number of cars handled is then limited by the size and character of the vessels receiving the coal; but very prompt service is always furnished. These cars are all of 50 tons capacity, the smaller cars being unloaded on the other two wharves.

The average tonnage delivered at this terminal was 196,888 per month, for 1902, which is only rendered possible by the excellent facilities for handling and weighing cars that have been provided.

As an example of the amount of coal and coke hauled

and delivered at the terminals, the statistics of 1902 may be cited. In that year 2,362,660 tons of coal and 69,380 tons of coke were hauled to tide water. In addition to this there were 2,468,108 tons of coal and 645,301 tons of coke hauled eastward from the fields to local and connecting points, making a total eastbound movement of 4,830,768 tons of coal and 714,681 tons of coke. During the same period the westbound movement was 1,824,919 tons of coal and 819,538 tons of coke, making a total output of the coal fields delivered to the Norfolk & Western Ry. of 6,655,687 tons of coal and 714,681 tons of coke.

The general plan of the terminal with an outline side elevation of pier No. 3 is shown in the drawings. The switch connections are such that piers Nos. 1 and 2 are served by engines pushing the loaded cars to the top of the incline, whence they drop by gravity to the outer end of the pier and thence over the switchback to the two tracks reserved for empties, as already stated. The method of handling for pier No. 3 had already been described. The yard tracks drop down to the barney pit on a grade of 1.33 per cent., from which point the incline rises on a grade of 25 per cent. to the top of the pier at a height of 72 ft. 2 in. above mean high water. From this point the grade along the top of the pier over the chutes have a maximum and minimum height of delivery of 31 ft. and 27 ft. above mean high water respectively.



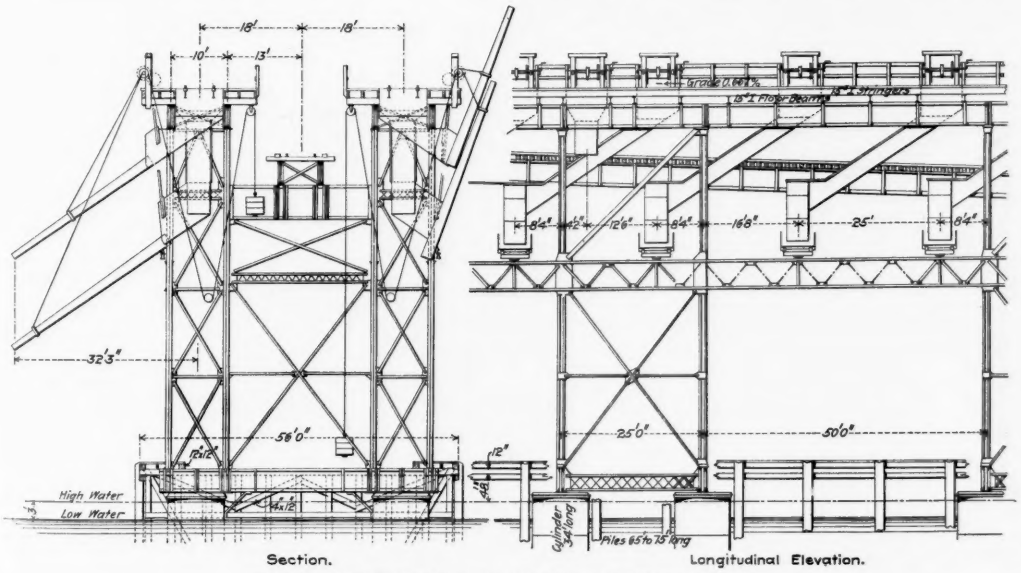
At the center of the pier and at each end there is a bunker pocket and chute, the latter delivering at a height of from 43 ft. to 47 ft. above high water. The height of the pier makes it specially suitable for promptly supplying coal to the bunkers of ocean steamers.

The main pockets are spaced 25 ft. from center to center, and the chutes are arranged to swing 12 ft. 6 in. on either side of the center, so that coal can be delivered at any point along the whole length of the pier, and any arrangement of hatches on the vessel be reached, without involving the necessity of warping the latter into a position that may be inconvenient.

The working of the pier is carried on with remarkable smoothness. A few men in the yard drop the loaded cars down the barney pit, one at a time; the engineer is signaled to start and the car is pushed up the incline, where another man boards it and drops it down over the chutes. After it is dumped, a third runs it over the switchback, where it is automatically turned into the center track by a spring switch. And finally the empty cars are run down into the yard in strings of five or six, whence they are made up into trains to be returned to the mines.

In spite of the fact that the floor of the car stands 75 ft. above mean water level and the bottom of the hold of some of the vessels to be loaded is 10 ft. below this, the arrangements are such that the breakage of the coal is no greater than where the total fall is much less. This is because the chutes are long and carried on an incline at which the coal will naturally flow, so that the actual fall is dependent solely upon the depth of hold of the vessel being loaded and the height of the trestle of the wharf has no real influence in the matter.

Such are the main features of the terminal facilities of the road, and they are particularly well adapted to the class of traffic to be handled.



Coal Pier, No. 3, Norfolk, Va., Norfolk & Western Railway.

pockets is 0.667 per cent., while that of the return truck after passing the switchback is 2.833 per cent.

The approaching trestle of this structure beneath the incline is of wood but the pier proper is of steel. The drawings show cross and longitudinal sections of the structure. It is carried on 50 nests of piles enclosed in steel cylinders, of which 42 are 10 ft. and eight are 8 ft. in diameter. The shells of these cylinders are ⅜ in. thick and those 10 ft. in diameter enclose 20 piles. The interior is filled with concrete; the top 5 ft. being of Portland cement. These cylinders are arranged in groups of four with a double plate girder connecting them transversely and a lattice girder longitudinally. They are protected from injury by a line of piling, along the outer face of the pier, which also serves to carry the floor. The cross section shows the arrangement of the chutes for delivering coal to the vessels, and the method of counterbalancing. It also shows the relative locations of the two delivering tracks and that for the return of the empty cars. On the longitudinal section will be seen the means that have been taken to avoid an excessively high drop for the coal due to the height of the pier. After falling into the pockets the coal is carried to one side before reaching the chute so that it enters the latter at a lower point than would otherwise be possible. There are 24 regular pockets upon each side of the pier, whose

Foundation Brake Rigging.*

The strength of a chain is that of its weakest link; and since the rods, levers, pins, brake-beams, etc., are important factors in the chain of parts which go to make up the complete air-brake in the application of high-speed brakes to heavy passenger cars and the use of high pressure control of large capacity coal and freight cars in the mountain districts, due consideration must be given to the ultimate strength of the parts referred to. While it is absolutely necessary that they be of sufficient strength to withstand the strains imposed by the higher pressures, yet it is not desirable to have the parts too heavy, for in that event much of the benefit to be derived from the use of higher working pressures will be lost in effecting a movement of the foundation gear which might be unnecessarily heavy.

Since the brake cylinder is the most important part of the subject we are considering, I would call attention to the different sizes of cylinders which the brake companies recommend for cars of various weights. The size of the brake cylinder on a car controls the total leverage, and the total leverage in turn is responsible for the distance brake-shoes will hang away from the wheels when brakes are released. This last feature coupled with proper brake-beam suspension has an important bearing upon the trouble experienced occasionally with hard pulling cars in a train. The following are the proper diameters of cylinders recommended for cars and locomotive tenders of different weights:

Light weight of car or tender ranging from
15,000 to 30,000 pounds..... 8-in. cylinder.
30,000 to 47,000 pounds.....10-in. cylinder.
47,000 to 68,000 pounds.....12-in. cylinder.
68,000 to 92,000 pounds.....14-in. cylinder.
92,000 and over.....16-in. cylinder.

*A paper read at the May meeting of the New England Railroad Club by Henry Kolseth.

There are equally as good reasons why a car or locomotive tender should have brake cylinders of proper size as it is that a locomotive of certain weight have properly proportioned steam cylinder in order to do the work the engine was intended to do.

By "total leverage" is meant the leverage required to raise the brake cylinder pressure to the pressure exerted on the brake-shoes against the wheels, and includes the proportion of both cylinder and truck levers. The braking power required for a car divided by the brake cylinder pressure will give the total leverage, and this result in any case should never exceed 10, for, as before stated, the higher the total leverage the less clearance there will be between brake-shoes and wheels when brakes are released and the greater the tendency for shoes to rub the wheels at certain points along the road.

A standard cylinder lever should be adopted about 38 in. long between outer holes, to have but 3 holes, the center one to be in a position to develop a brake force equal to 90 per cent. of the light weight on wheels braked. The old plan of having a series of holes at the outer end of the cylinder lever has been found to be objectionable and should be abandoned. As in the case of all other brake levers and rods under the car, this one must be of sufficient breadth and thickness to conform to Master Car Builders' standards. The length between holes of the tie rod which connects both cylinder levers together should be about 42 in., as this length gives the cylinder levers a much better angle.

With six-wheel trucks body levers that connect with long truck levers should be so proportioned as to obtain a more equal division of cylinder lever arm when cars are properly braked. The importance of using a standard truck lever having a proportion of not over 4 to 1 and as much less as possible for four-wheel truck passenger cars and locomotive tenders cannot be overestimated, especially on cars already equipped or to be equipped with automatic slack adjusters. Truck levers of the proportion mentioned on slack adjuster cars will wear out an entire set of shoes without assuming undue angle.

It is doubtful whether any part of the foundation brake-gear has received less attention in the past than brake-beams. Attempts have been made to use the brake-beams of various types in connection with high-speed brakes which were really unfit for service in connection with the ordinary 70-lb. pressure brake, and because they failed to stand up to the work imposed by the strains of high pressure the high-speed brake has been condemned on more than one occasion. The same beams have failed and are failing under the strains of the ordinary 70-lb. pressure brake, and it is little wonder that they refused to stand up under the heavier and more exacting requirements of high-speed brake service. Had more attention been given to the quality of brake-beams that were placed upon cars built during the last few years, there would now be little difficulty experienced as a result of the installation of high-speed brakes, at least so far as the beams are concerned.

A good stiff metallic beam having an ultimate strength of about 50,000 lbs. is the proper thing for this service. Attempts have been made to use a 3¾ in. x 5½ in., also some 6 in. x 4-in. deep, trussed, wooden beams, but all of the wooden beams, as a result of continued service, deflected to such an extent as to make their use objectionable. Those who were formerly staunch supporters of the wooden beam are now willing to accept a good metallic beam in its place. Many beams now in service and otherwise perfect, are too long, and as a result brake-shoes frequently lap over the outer edge of wheel, causing unequal shoe wear and consequent loss in retarding effort.

Nothing in connection with the application of brake-beams to cars is so important as their proper hanging. This is especially true of beams having solid or non-adjustable brake-shoe heads. Great care must be exercised in suspending this type in order that the line of force, which is always parallel with the body of car or the rail, will act through the heaviest section of the beam. Beams having solid heads are designed to be hung a certain distance from the rail, and this necessarily requires different heads when it is desired to hang beams at varying heights. If an attempt is made to place one of these beams designed to be hung 15 in. from the rail on a car which owing to the construction of truck would not permit of a distance of over 10 in., the center line of the brake-beam will be at an angle to the rail, which, in this case, represents the line of force. This condition during brake application brings the pull through the weakest section, resulting in the deflection of beam which is accompanied by a considerable loss in power on the brake-shoes. Tests made prove conclusively that if beams of this character are properly hung, a train can be stopped in a much shorter distance than would be the case if beams were hung as mentioned in the foregoing.

If when a beam with a fixed head is used, it is hung at a different height from the rail or the center of the wheels from where it was intended to be, the brake head will have an angle not in proportion to its design. Supposing that the hangers were 2 in. longer than called for, the result would be that when the brakes were applied and the shoes up against the wheels, the brake-beam strut would be pointing upwards, and as the stress required is parallel the result would be that this stress would be partly downward on the beams, resulting either in a permanent set of the beams or greater wear on top of shoes.

In directing attention to the advantages to be obtained from inside hung brakes and inclined hangers for four-

wheel truck cars in passenger service, and locomotives, the following extract from a paper by Mr. R. A. Parke on "The Effect of Brake-Beam Hanging Upon Brake Efficiency," and read by him before the November, 1897, meeting of the New York Railroad Club, is of interest.

"It has been the practically universal custom to suspend the brake-beams of passenger trucks outside of the wheels. This is radically wrong if proper efficiency of the brakes is desired. There seems to be little objection to hanging passenger brakes between the wheels. There appear to be many advantages in doing so. The objection, if any, would appear to be somewhat less accessibility: and this objection appears to be of small significance in comparison with the advantages. The most important advantage is that the brake-shoe pressure upon the different pairs of wheels may be so proportioned that in emergency application of the brakes, trains may be stopped in from 10 to 15 per cent. shorter distance, without any increased liability of injurious wheel sliding. The tilting action of the ordinary passenger truck during an application of the brakes and the resulting jolt at the stop is due in part to the fact that the truck is being dragged forward by the car body, against the resistance offered to its continued motion by the rail friction. This tilting action is much aggravated because of the fact that the brake hangers of the rear brake-beam are thrusting upwardly upon the truck frame while the hangers of the forward brake-beam are pulling downwardly upon the truck frame. By hanging the brakes between the wheels the hangers of the rear beam pull downwardly, while the hangers of the forward brake-beam push upwardly, thereby tending to diminish the tilting of the truck instead of aggravating it, as in the case of outside hung brakes.

"The weight of the brake-beams and attached parts when inclined hangers are used tends to swing the brake-shoes away from the wheels after release of the brakes, and gravity thus accomplishes what ordinarily requires the use of brake-beam release springs. There is no more pernicious a feature of ordinary passenger brake gear than the brake-beam release spring. It is practically impossible to so temper and adjust these release springs that each shall hold its brake-shoe away from the wheel with the same force. If the release spring at one end of the brake-beam is weak while that at the other end is stiff, it is hardly possible to secure enough slack to prevent the shoe from dragging upon the wheel at the end having the weak release spring, without permitting excessive slack at the stiff spring end. It therefore happens that all the release springs are usually made stiffer than is necessary. The wide variation in the stiffness of the release springs makes it almost an impossibility to determine the proper braking power for a passenger car, as the amount of such power which will be absorbed by the brake-beam release springs is a very uncertain quantity.

"The inside hung brake gear for passenger trucks is not only more compact and simple, but it is less costly in construction and maintenance. It enables brake-shoe slack to be taken up more evenly and completely. It enables the proper braking power—and thus the full efficiency of the brakes—to be calculated with greater certainty. In connecting and disconnecting the brake gear upon the truck there is no resistance of release springs to be overcome, and the removal and replacement of brake-shoes is thereby facilitated. All this is in addition to the fact that the brake-beams may be so suspended as to enable the train to be stopped in 10 or more per cent. shorter distance than when the brakes are outside hung, with no greater liability of sliding wheels and with the removal, to a large extent, of the discomforting jolt to passengers that is so often experienced as the train comes to a stop."

There would be considerable benefit derived if a change could be made in the design of six-wheel trucks, with special reference to an end sill having a shorter recess at the top and an extension of the portion removed from each end toward the center on the lower side. The purpose is to raise the brake-beam hanger brackets and the rigid ends of brake-beam release springs, thus lengthening the brake-beam hangers as well as release springs, the present construction being detrimental to both the air-brake and the truck.

The standard Master Car Builders' foundation brakes, as well as those used on Pullman cars, have held up well under high-speed brake service, yet in designing new equipment it may be advisable to limit fiber strains to about 18,000 lbs.

Faulty design of foundation brake gear is one of the most prolific causes for flat-slid wheels, because where it exists it is usually responsible for unequal distribution of braking power. When designing brakes for new cars in addition to watching closely the points which have already been covered, it is also very necessary and desirable that the following points also be observed:

Where it is really necessary to use brake-beam springs to insure throwing slack to the brake-shoes when the train is moving, the length of brake-beam springs from their rigid ends to contact with beams should be as great as practicable, and adjustable springs should be employed.

A chain safety hanger for brake-beams should be used in preference to other types, as frequently the latter are located in such a position as to allow the beam to strike same with the result that they detract greatly from the braking power and affect both air and hand brakes.

Where brake-beams are hung from the outside of truck end sills, the hangers must be bent so that they will clear the truck end sills when the brakes are applied. Frequently these hangers are found striking the heavy iron plates at the underside of truck end sill, and where this occurs a vast amount of braking power is lost.

In locating lever guides under cars they must be of sufficient length so that levers will not strike the ends of same even if all shoes were removed from car.

No car should be permitted to run unless braked on every wheel. Frequently cars are seen running in limited trains and having six-wheel trucks braked on but four wheels.

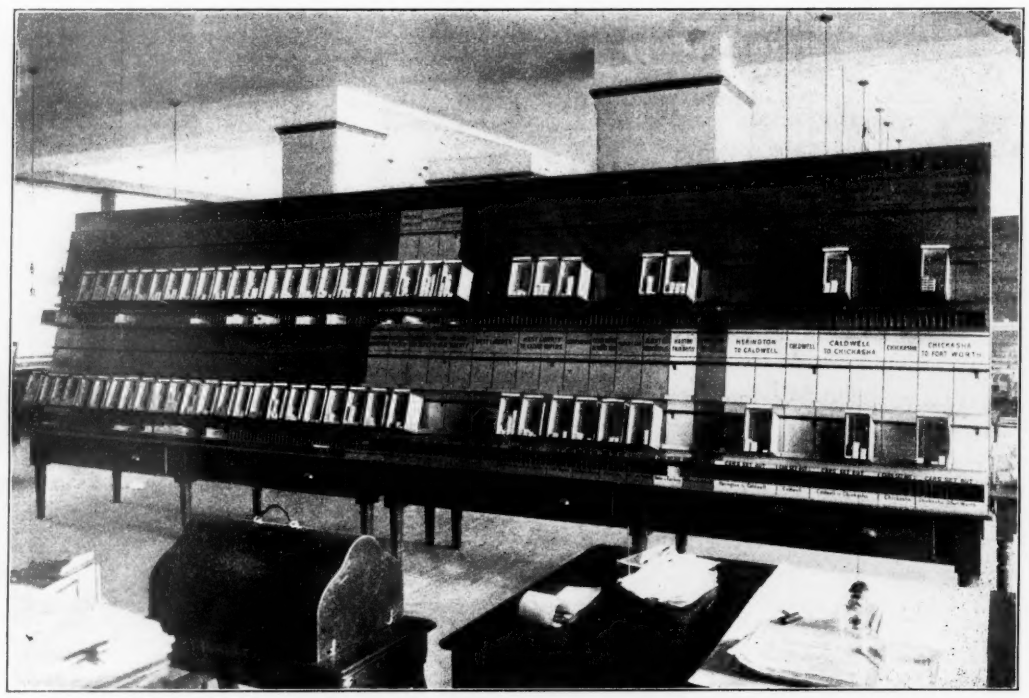
Attention must be given to the length of lower truck rods under six-wheel truck cars so as to give the short equalizing lever a proper angle, thus preventing it from striking the back of the jaw of the middle brake-beams and diverting the braking power, which belongs to the middle beam, to the ones at each end of the truck.

Better provision should be made for car inspectors to take up the slack for the purpose of shortening the piston travel on some of our heavy six-wheel truck cars. Many cars are running with excessive piston travel, and consequently shirking their duty simply because inspectors cannot move turnbuckles in the short space of time they are allowed for this work.

Cases have been cited where the brake cylinder piston traveled 3 in. further when car was running than when same was standing. This was caused by undue amount of lost motion between the bolster and cross bearers of truck. The slack adjuster will detect this, in fact, it has been condemned on more than one occasion for taking up the lost motion referred to. Attention was recently directed to a tender brake in which the piston moved about 4 in. before any movement was given to the brake levers. The reason for this was a short push rod, and this is a frequent occurrence. These rods should be of such length that they will start to move at the same time that the piston moves when brakes are being applied.

Rock Island Time-Freight Board.

The car service department of the Chicago, Rock Island & Pacific has a time-freight board which embodies the results of experience with devices of this kind. It is made on the same principle as that in use on the Great Northern, devised by Mr. C. H. Cannon, formerly with that road, and now Superintendent of Car Service of the Rock Island.



Time-Freight Board of the Rock Island System.

Under normal conditions, with no extraordinary interruptions, the board serves as a detective, keeping track of the individual car of freight in a way that is designed to admit of no neglect or oversight; and under unusual conditions, such as the recent freight congestion, and the floods, the board has proved of peculiar service.

It is 21 ft. 6 in. long and 5 ft. high, surmounted by a name-board 6 in. high. There are two parts, one for westward trains and the other for eastward.

The board carries boxes and blocks to represent the fast-freight movement of the entire system, or 6,119 miles of road. The method of dividing it is apparent from the engraving. It should be explained that a working arrangement of the board is not shown by the engraving, the boxes having been ranged in this way so as not to obscure the lettering. Main lines and branches are distinguished one from the other by contrasting colors. For instance, the upper half of the board represents the main line from Chicago to El Paso, which runs via St. Joseph and also Kansas City, the former being the main line. The branch via Kansas City is therefore given a light color, readily discernible in the engraving.

Each division terminal has a single space, and the part of the line between two such terminals has a single or double space, as may be necessary. There are four rods or pipes on each side of the board on which the trains, represented by the boxes, are run. The boxes are swung to the rods by hooks and are moved from point to point as the trains move over the road, advice regarding their movements being received from terminal points.

Each car of time freight is represented by a block, of distinctive form, which is placed in the box representing the train containing that car, a box having capacity for 64 blocks. Each block has a small colored tag inserted in a groove running across its end, on which is written the number of the car. On the face of the block are two other grooves or slits into which is slipped a card on which is written the car number, contents, destination, loading point, and train in which forwarded. The colored tag on the end of the block also indicates the kind of freight in the car. Meat, for example, is represented by a bright red tag so that at a glance one is enabled to tell how many cars of meat are in time freight trains, and how many have been set out and are standing on side tracks. The receptacles for set-out cars on the board may be seen in the engraving. In case a car is set out at any point, either at or between terminals, the "car" is removed from its "train" (box) and put in the set-out receptacle under the name of the station or locality where it was set out. A telegraphic report advises the car service department of the setting out of the car and the reason therefor. The department then sees to having the car picked up as soon as possible.

At the initial point of a train a report is made out by the agent, showing all cars of time freight forwarded. This report is sent by wire, giving car number, initial, train forwarded by, date, contents, destination, and junction point at which the car leaves the line; and if perishable freight, the name of consignee. All of this information is entered on the slip carried by the block representing the car. On the outside of the box representing the train is a tin receptacle for holding a card giving the scheduled and the actual time made by the train. When cars have reached their destination, the slips are taken from the blocks, the schedule card is taken from the side of the box, and the two put together and filed, so that at any time any information asked for in regard to the cars in this particular train can readily be given.

It takes about 150 boxes for the regular trains moved on this board. As all time-freight movements are reported by wire, the records show within a very few hours of the exact location of time freight cars. In this way all information asked for in regard to time freight can be quickly furnished and preventable delays prevented.

The Money Market and Railroad Loans.

The violent break in stocks this week—in some cases to prices nearly as low as were reached in the panicky decline of May 9, 1901—has a close connection with the money market for railroad securities. In the stock market the characteristic phenomenon of the week has been the apparent pressing for sale of high-grade railroad stocks. On the other hand, the action of the Union Pacific and Chicago, Burlington & Quincy Railways in borrowing at the equivalent of 6 per cent. from the banks is evidence of the disturbed condition of railroad credit for the time being.

This situation was in a way foreshadowed by the Pennsylvania Railroad's experience. It is true that the Pennsylvania succeeded eventually in placing its $75,000,000 stock with investors and at the price named in its original proposal; but the company had been forced to employ the services of an underwriting syndicate, and the price of its stock, after the closing of subscriptions, fell to a figure slightly below that at which the new stock had been allotted. Moreover, it was recognized as a practical fact in the situation that the $90,000,000 capital received by the Pennsylvania for its new shares, even after allowing for the repayment of $40,000,000 notes with a portion of it, represented withdrawal of a very

large sum from the investment market's available resources. To that extent the next corporation to ask subscriptions to its securities by the public would presumably have a harder task than the Pennsylvania.

There is, of course, no doubt that such companies as the Union Pacific or the Burlington could, at a price, have raised through sale of their securities the sums desired, or much larger sums. But with the investment market in its present abnormal position, two possibilities were involved, neither of which a prudent corporation borrower would wish to invite. One was the chance that the public, uneasy over the action of the market, might not have chosen to bid the price prescribed, which would have placed the company in an embarrassing situation; the other, that the issue price might have to be placed so low as to make the whole operation unduly costly to the company.

For, it must be remembered, the selling of stock or long-term bonds at an abnormal discount entails quite as large a loss on the borrowing company as the raising of temporary loans at an abnormal rate of interest, with this distinct advantage in favor of the second operation, that the loans are temporary and may be replaced, when matters have quieted down in Wall Street, by proceeds of security issues placed at a normal price. Such additional charge as would be entailed by a bond issue forced at a sacrifice on an unwilling market would continue for 50 years, or whatever might be the term of the obligation. The 6 per cent. rate paid for the twelve-month loan would last only until the loan's maturity. It is, therefore, clear enough that the borrowing companies acted wisely in electing to borrow on their notes.

When, however, we come back to the conditions which made the present abnormal situation possible, the problem is not so simple. In a general way it is admitted that the security issues of the past few years have absorbed a considerable part of the community's investment capital; that there is not at the moment enough left available for present needs. This statement of the case, however, calls for some qualification. That the capital can be had on proper security and on the investor's terms is proved by the very negotiations to which we have referred, and to the fact that loans have been made all the week by the banks to individuals below 6 per cent. and the proceeds invested by the borrowers in first class securities at ruling rates. But this available capital has been frightened by the misfortunes of two or three ill-constructed industrial concerns and by the course of affairs on the Stock Exchange, and hence fixes harder terms than usual for the accommodation. The conclusion, however, is, from the transactions noted, that at a price the capital can be had.—*Commercial and Financial Chronicle.*

Power Brakes in St. Louis.

BY R. P. GARRETT,
Engineer, Board of Public Improvements.

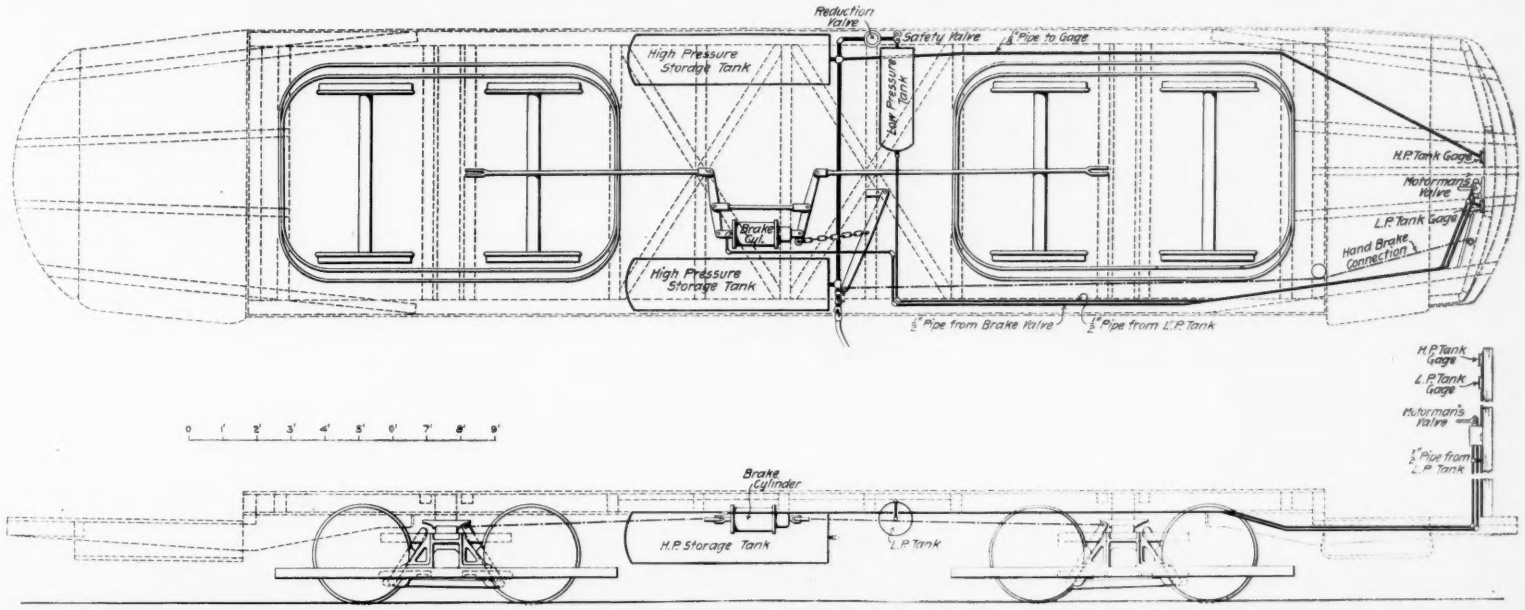
The city of St. Louis, which has a population of about 800,000, including near-by suburban towns, is now trying an interesting experiment in requiring, by municipal ordinance, the use of power brakes on all street cars. Although some suburban trains are run by the steam roads, nearly all of these trains take their departure from the Union Station, which is 13 city blocks from the business center of the city. Consequently the great population depends almost solely on the street cars for suburban transportation.

The business portion of the city lies along the Mississippi, almost midway between the extreme south and north city limits, which also extend west about seven miles. The lines from East St. Louis crossing the river on the Eads Bridge land the East St. Louis crowds at Third and Washington avenues; almost the center of the business district. In this connection it may be said that with the exception of three north and south lines and a few short lines, all street car lines enter the small business section. For rapid service, far too many cars enter this section, six blocks by six, or between Washington avenue and Market street and between Fourth street and Eighth street. The progress of a car entering the congested district is necessarily slow, as it must take its turn on one of the various loops. In making the trip around the loop in the business district slow progress is made, since many lines use the same loop and the car must cross other crowded lines and sometimes wait several minutes before it can cross. In case of an accident to a car, all the cars on the loop are delayed. In order to keep up the schedules, all this lost time must be made up, and the motorman usually attempts to accomplish this by increasing the speed of his car somewhere in the less crowded business portion or the residence district of the city. In most street car schedules there is not much time to spare even when the cars run on time. The cars are usually limited in time to the very best speed it is possible to make safely, and, when making up time, hand brakes are too slow and hand-power is often too weak to stop a 24 ton car in time to avoid accidents.

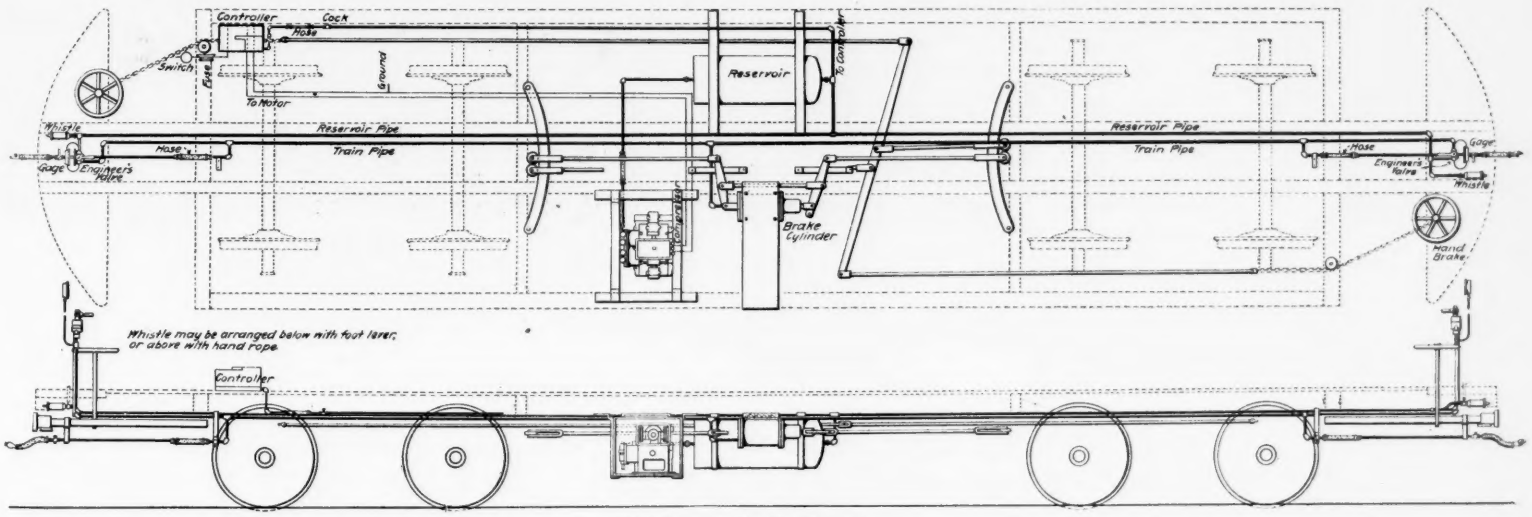
To avoid or lessen the number of street car accidents, the Mayor of St. Louis, early in 1902, approved an ordinance passed by the Municipal Assembly, requiring all street cars in St. Louis to be equipped with brakes of a design to be approved by the Board of Public Improvements in writing; granting the Board the right to revoke any certificate of approval which might have been given; forbidding the use of brakes which had become broken or dilapidated, and prescribing penalties for violation.

It became the duty of the Board to examine and pass upon all designs for brakes submitted to it by any street railroad, and to furnish a written certificate of approval or of disapproval, after which the company was allowed 60 days in which to comply with the order. At the expiration of that period, failure to comply became a misdemeanor, punishable by a fine of not less than $100 or more than $500; each day's violation to constitute a separate offence. The words "power brake" were not used, but it was specifically provided that the Board should "approve only of such designs of brakes that are more effective in quick stopping of cars, and conducive to the greatest safety of the public."

The ordinance was approved April 16, 1902, and after its passage the Board of Public Improvements made extensive investigations into the question of air-brakes as adapted to use on street cars. As a result, they approved for use on St. Louis street cars several different makes of brakes, among which were the Christensen compressed air-brake, Standard compressed air-brake (Westinghouse), Westinghouse electro-magnetic truck and wheel brake, and Neal hydraulic brake. If at any future time any other air-brake company wishes to have a brake approved for use on St. Louis street cars the Board will take the matter under consideration, and if the brake meets the Board's requirements then the Board will give its approval. The street car companies may then use their option as to which particular brake they will use.



Westinghouse Air Equipment.



Christensen Air Equipment.

The St. Louis & Suburban Railway operates 150 cars, nearly all equipped with Christensen air-brakes, each car carrying an individual air compressor operated by a motor. The same make of air-brake is used on the St. Louis Water Works Railway and gives good satisfaction. It is operated on from 60 to 80 lbs. air pressure.

The St. Louis Transit Co., operating about 1,500 cars varying in weight from 16 to 24 tons, has adopted the Westinghouse brake. Each car is to be equipped with a regular air-brake, but the individual car will not carry an air compressor. The air is to be supplied from a central plant located near the car barns. This air compressor will supply air to the cars from a large tank, at a pressure of 300 lbs. Each car is to be equipped with a high pressure tank to carry air at an initial pressure

of 300 lbs., and an operating tank connected to the high pressure tank through a reducing valve so as to supply air for operating the brakes at 40 to 60 lbs. It is estimated that the tanks will hold enough air to make three round trips of about 12 miles with 24-ton cars.

As yet this system of brakes has not been in operation long enough to form any opinion as to its merits, but there seems to be no good reason why it should not work satisfactorily.

Timber for Railroad Ties.

Mr. J. C. Hawkshaw in his President's address to the Institution of Civil Engineers says:

If we take the length of single line in the United Kingdom, including sidings, at 45,800 miles, there are in use about 90 million ties, and the annual consumption for renewals may be taken at about 3¾ million. Much timber is used by railroads for other purposes, e.g., for fencing, for telegraph and signal-posts, for buildings and rolling stock. Another large item is the timber used for temporary work. The importance of this is better known to the contractor than to the engineer, who rarely has to take account of it in measurements or certificates. The timber used in permanent work for the Alexandra Dock at Hull amounted to 482,000 cu. ft.; that for temporary work was more than three times as much, namely, 1,500,000 cu. ft. The timber used for temporary purposes will, on an average, be equal to the quantity used in permanent work, and it will often be two or three times that amount.

The value of the ties in the road in the United Kingdom is about £18,000,000, and the annual cost of renewals about £750,000; to this must be added a further expenditure of about £500,000 a year for timber used on railroads for other purposes, giving a total yearly expenditure of £1,250,000, exclusive of what is required for rolling stock.

For the last 30 years we have heard it said in this room that steel would shortly by adopted in place of wood for ties; but although we could make our own steel, and have to import our timber ties, this has not come to pass. France has experimented for years with iron and steel ties, but few are laid in that country, which, in spite of her well-managed forests, l. s to import ties. More metal ties are used in Germany, a. o a timber-importing country; but Germany still uses much wood for ties. Metal ties are used in South Africa, and, together with native timber, in Australia, India and South America. In Argentina some of the iron ties have recently been replaced by native-wood ties. The United States and Canada employ wood only, and in proportion to their railroad mileage they use more wood for ties than any other country, 2,500 to 3,150 being laid per mile in the States, and 2,600 to a mile in Canada, as compared with 1,760 to 2,145 per mile in England.

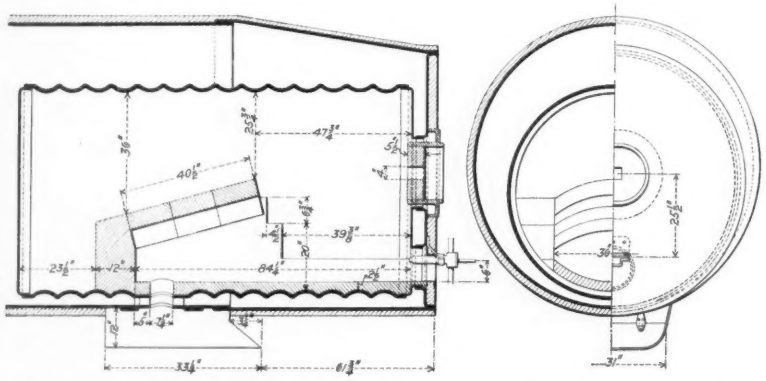


Fig. 1.—Sections Through Fire-Box—Southern Pacific Atlantic Type Locomotive.

The consumption of timber for ties increases yearly, and more ties are now laid to a mile than formerly, especially in the United States and Canada; but there is a tendency to reduce the number slightly in the United States, and to increase it in England. The increase in the use of creosote prolongs the life of ties and so somewhat reduces the consumption. The average life in this country, as determined by the quantity applied annually to the existing length of lines of some of our principal railroads, with their sidings, would appear to be 24 years. If applied to the mileage in, say, 1887, the life would appear to be 22 years. The life of the ties in the running-lines is, of course, much less. The life of timber ties, therefore, is not far short of that of steel rails. Germany and France do not confine themselves so much to the one class of timber. Germany uses nearly as much oak and other deciduous trees as pine. France uses both oak and beech. The latter, which in its untreated condition, lasts only 2½ to 3 years, has, when creosoted, a life equal to or even exceeding that of oak.

The one consideration, either at home or abroad, appears to be the life of the tie and the cost of its maintenance. Yet the preference for wood over metal must have been determined by other causes. In the many careful experiments made abroad on the various forms of metal ties, their life, except in some few unfavorable soils, has proved longer, and the cost of maintenance less, than was the case with timber ties. The effect of the tie on the running of the trains, or the wear and tear of the rolling stock, has rarely been considered. We have not kept to timber ties solely on the ground of economy, but because they give a better road—more comfortable to travel on, less destructive to the rolling stock, and less liable to accidents from broken rails—and afford facilities for repairs and alterations for junctions and sidings. Nevertheless, unless the world looks to its forestry, an iron permanent way is an evil which will have to be adopted.

The number of ties laid on the railroads of the United States alone at the present time is not less than 730 million, and the number used in the 12 months ending June, 1902, for extensions and renewals was about 110 million.

In addition to this, probably not less than 80 to 90 million cubic feet of sawn timber are required yearly in the United States for railroad purposes. The number of timber ties laid on all the railroads of the world will not fall far short of 1,495 million, and a low estimate of the value would be £180,000,000.

Oil Burning Apparatus for Southern Pacific 4-4-2 Locomotives.

In the *Railroad Gazette*, June 12, 1903, appeared a photograph and general description of a new Atlantic type (4-4-2) oil burning locomotive built for the Southern Pacific by the Baldwin Locomotive Works. The engravings herewith give a few details of the oil burning apparatus.

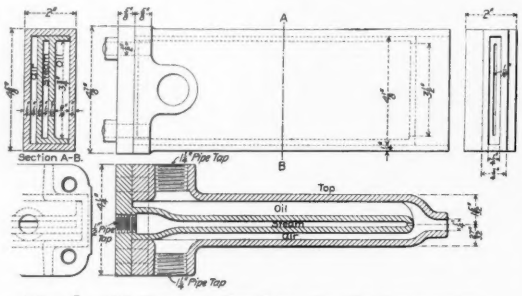


Fig. 2.—Oil Burner—Southern Pacific Locomotive.

Sections through the Vanderbilt fire-box appear in Fig. 1, while Fig. 2 shows the type of burner. The burner consists of two separate parts, the inner hollow casting serving for the steam nozzle while the oil and air passages are respectively above and below this nozzle.

The oil passes through a heater on its way from the tender to the burner. The steam for the heater and burner is supplied through ½ in. pipes branching off from the 1 in. blower pipe. The oil is fed to the burner through a 1¼ in. pipe, which combines with a 1¼ in. air pipe immediately above the burner. Another 1¼ in. air pipe is in connection with the lower channel of the burner, and assists in spraying and atomizing the oil.

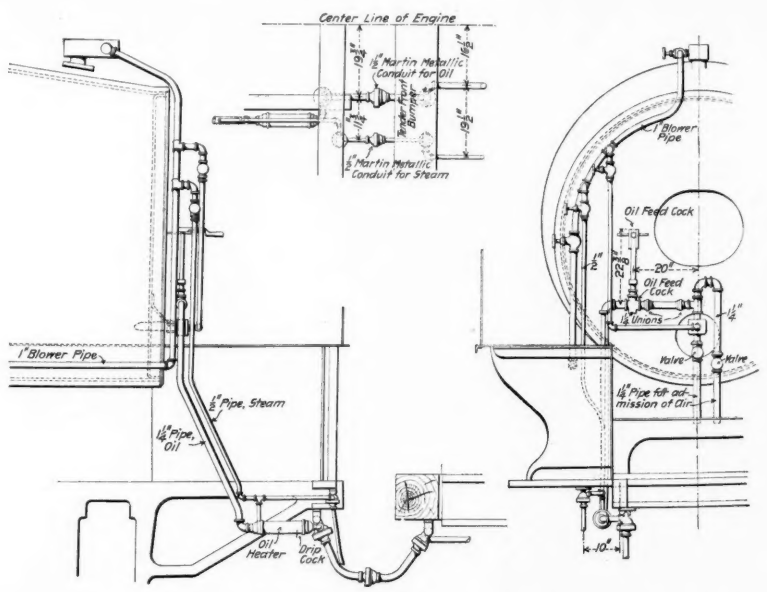


Fig. 3.—Arrangement of Air, Steam and Oil Pipes—Southern Pacific Locomotive.

Trades Union Outrages in June.

In the *Railroad Gazette* of July 3 there was reference to the fact that by actual count trade union members and sympathizers had been guilty of at least as many as 490 atrocious crimes between the months of October and May, and the statement was made that the "chronicle is not of the past but of the present and its infamous roll lengthens every day." As some verification of this latter statement, attention is invited to the following summary of trades union crimes during the month of June, which has been condensed from accounts of the outrages published in the newspapers at the times and places of occurrence. It will be perceived that this summary includes two murders of non-union men and one suicide of a union member who was forbidden to work by the union which, however, did not save him from destitution and the desperation in which he ended his life. Another case is of a union crazed man who shoots an old comrade and fellow workman.

Enumeration of the cases of assault is impossible when howling mobs are daily and nightly engaged in depredation, but a study of the events described in the list has developed the fact that a total of 164 outrages for the month, which includes 143 cases of personal assault, is conservative.

Philadelphia, Pa., June 1.—William Bangor, while at work with other non-union carpenters is approached by Otto Klingmyer, a union member, who hurls vituperation at them. Finding that they pay no attention to him Klingmyer draws a knife, rushes at Bangor, who is at work with his back toward him, and stabs him through the kidney, inflicting what will probably prove a fatal wound.

Philadelphia, Pa., June 1.—While Francis Weaver, a stationary engineer, is lowering a heavy girder into an excavation, Dennis Keough and W. J. McLaughlin jump up on the platform and demand to see his license as an engineer. When he tells them he is busy McLaughlin grabs the lever from his hand and the girder drops several feet. Weaver vigorously releases himself and, reversing the engine, saves the workmen on the ground below from being killed. Keough then rushes at him and strikes him.

Brooklyn, N. Y., June 2.—About 100 striking Italians set upon 25 others who had taken their places at street paving, chase them and bombard them with bricks and stones, injuring several.

Buffalo, N. Y., June 2.—Joseph Mains, one of the H. O. nail factory strikers, is arrested for assaulting A. W. Everett, who had gone to work in the factory.

New York, June 4.—A mob of men, women and children shout "scab," "blackleg" and "bread thief" at eight non-union men who had taken employment at the Franklin Dye Works, throw stones at them and completely block the traffic of the street.

New York, June 4.—Frank Doley, a foreman of the Ledgewood Manufacturing Co., is shot and seriously wounded by Frank Quinn, formerly employed in the same shop, but who had been so harassed by strikes and strikers that his mind had broken down.

Davenport, Iowa, June 4.—Otto Volk, a striking union lineman, assaults Arnie Perry, a non-union employee of the Central Union Company.

Chicago, Ill., June 5.—Eight union girl strikers of the Kellogg Switchboard Company are arraigned by six non-union girls who complain of a long course of persecution, saying that they were followed to elevated trains and there denounced; that their young men friends were asked to forsake them, and that they were threatened with bodily injury.

Milwaukee, Wis., June 5.—Seven union tannery strikers are arrested on the charge that "with malicious intent and by force of arms and coercion" they tried to prevent divers non-union men from going to work.

New York, June 6.—James Smith, a non-union horse shoer, is set upon by four strikers, hit upon the head and severely wounded with a heavy iron bar.

New York, June 7.—Two Hecla Iron Works strikers ask Olcott Jackson, one of the company's draftsmen, to leave his job and on his refusing knock him down, punch and kick him.

New York, June 9.—A crowd of striking Italians assault 60 non-union workmen employed by the Barber Asphalt Co. with cobble stones and bricks, and hurl several volleys of stones at the policemen, who finally close in upon them.

New York, June 9.—Three hundred Italians armed with shovels, sticks and stilettos attack non-union workmen on a row of new houses; a pitched battle follows, in which many are injured.

New York, June 9.—Several hundred women and girls join husbands and brothers in an attack on four non-union workmen laying curbstone in new Jefferson Park, and throw missiles at the police.

Jersey City, N. J., June 10.—Robert Lackey, a strikers' picket, is arrested for assaulting Charles Smith, of the Theo. Smith Co.

Lowell, Mass., June 13.—Laurent Grenon, a striking mule spinner, invites Joseph A. Carrier to join the union, and upon his refusing Grenon and a companion hit him 15 or 20 times, knock him down and pummel him.

New York, June 13.—Louis Goldstein, because he would not join in a boycott instigated by the Fish Ped-

lers' Union, is attacked by David Stolenberg and a mob.

New York, June 16.—Lewis Harber, whose employees have struck, tries to keep his bake shop running by working at the ovens himself, aided by his wife. The strikers tell him that unless he closed up his business they would wreck his store and kill him, and a crowd of them finally attack him and his wife, hitting Harber on the head with an iron bar.

Chicago, Ill., June 16.—Fifty union barbers with friends and sympathizers caused a riot in front of the non-union shop of John Klank, preventing customers from entering the place under threats of violence.

Chicago, Ill., June 16.—Two striking waiters insist that the other waiters at Pick's Summer Garden quit work, throw a chair at one of them and then proceed to demolish the interior of the place generally.

New York, June 17.—Strikers at the shop of Robert T. McMurray & Bro. gather in a crowd and threaten men who have taken their places.

Richmond, Va., June 25.—A mob wild with fury throw stones through cars, smashing glass and everything in the way. Stones hit a motorman in the face and a shot strikes a guard in the eye. Then the guards open fire in return and several are injured on both sides.

Chicago, Ill., June 25.—Union freight handlers of the Chicago & Alton Railroad on strike distribute circulars asking that no bread, meat or other necessaries of life be sold the families of the freight handlers who would not join in the strike, and hound some of their wives into illness.

Richmond, Va., June 26.—After night a gang of would-be assassins from concealment in a field along the track turn a galling fire of rifles and pistols upon the Main street cars passing within 100 ft. of them, and before they are dislodged wound two of the militia and a motorman.

Richmond, Va., June 27.—William Tucker, a passenger on a Main street car, is shot in the arm and side

Narrow Gage (36 in.) Copper Ore Car for the Cananea Consolidated Copper Co.
Built by the Middletown Car Works, from designs by Mr. George I. King.

Dubuque, Iowa, June 17.—Striking employees of the Union Electric Company inaugurate a series of riots. A great mob parades the streets, threaten the manager of the company, demolish the power house with stones and bricks, and hurl missiles at the troops summoned on request of the sheriff.

Richmond, Va., June 18.—The first cars that the trolley company attempts to run since the inception of the motor men's and conductors' strike on June 17 are pelted with mud, filth and eggs, one lady being injured.

Rochester, N. Y., June 18.—George C. Hetzel and Elmer Boss, striking employees of the Rochester Packing & Cold Storage Company, take hold of the bridle of a horse driven by Michael Koch and say that if he continues to drive for the company they will knock his head off the next day.

New York, June 20.—Louis Dorr, a bricklayer, unable to obtain work because of the building trades strike, and reduced to destitution, commits suicide by taking carbolic acid.

Richmond, Va., June 22.—Crowds of strikers and strike sympathizers have daily and nightly gathered on the streets, using intemperate language and throwing missiles at the cars the company attempts to run. On this day a lady passenger is struck on the hip by a glass bottle and painfully bruised.

Richmond, Va., June 23.—There is a riot in 18th street, cars are attacked by mobs in the West End, the tracks in Fulton avenue are obstructed with rocks, bricks and cement, and an attempt is made to burn the trolley bridge at Rocketts. Howling mobs consisting largely of well dressed, intelligent appearing men, turn the city into pandemonium. Captain Shinberger at the head of a body of policemen is struck with a rock and injured. A motorman trying to run a blockade is brought to a standstill by a mob; the Mayor orders him to proceed, but he is then struck on the head with a brickbat and blood flows from the wound, before the Mayor's eyes. Then a conductor is struck in the face with a stone and taken to a hospital for treatment. Officer Harris is struck in the knee with a brickbat and severely injured. A dummy of a man dressed in black is hung from a wire over the Laurel street car tracks.

New York, June 24.—A crowd gathers at the Mosland Dye Works and attempts to mob the non-union workmen. Later they set upon the foreman, bruising him and cutting his face.

Chicago, Ill., June 24.—Five men, union sympathizers, are arrested for assaulting men who escort non-union young women employees of the Kellogg Switchboard Company to their homes.

Richmond, Va., June 24.—Mobs gather at the barns, surge upon the cars and attack the motormen, injuring two of them. All day the streets are filled with shouting and yelling crowds. The officers of the trolley company apply to the Mayor, who asks the Governor for aid. Twelve companies of the 70th Regiment are immediately summoned and placed under the orders of the Mayor. As soon as the militia take charge of the operation of the cars two companies guard a car on its way out of the Clay street bar and Captain Skipwith, commanding Company C, is wounded in the leg. Under a fusillade of rocks the motorman climbs to the roof of the car and removes an obstruction from the wire and the car proceeds through the wildest uproar since the strike began.

from ambush, and there are said to have been scattering exchanges of shots between guards and marauders.

Lynn, Mass., June 27.—In a fight between members of the Boot and Shoe Workers' Union and the Knights of Labor Cutters, one of the participants is given a severe drubbing, a police officer is resisted and receives injuries.

Chicago, Ill., June 28.—Jesse McClain, who had refused to join in a boilermakers' strike, is called to the door by two men who fire two shots at him, one of which strikes him in the groin and kills him.

Richmond, Va., June 28.—There is one unsuccessful attempt to wreck a car and a few ineffective bullets are fired in the West End.

Richmond, Va., June 29.—An attempt is made under cover of night to wreck a store at Norfolk owned by the president of the Richmond Trolley Company, and partly occupied by some of his kinspeople.

Richmond, Va., June 30.—Two sticks of dynamite are discovered concealed in the grass near Marshall Park. A rock is thrown at a sentry, who fires a shot in return.

Middletown Car Works.

Referring to persistent rumors of consolidation, Mr. George I. King writes: "We do not know how the rumor originated; it certainly is without foundation in fact. We are about finishing up 40 refrigerators for the Central of New Jersey; have just completed two 100,000 gallons Vanderbilt tank cars for the W. H. Rankin Co., of Elizabeth, N. J., and have also turned out this week one 100,000 lbs. capacity structural steel special flat car for the Standard Steel Works, besides which we have on our books orders from the Brooklyn Heights road for 52 steel underframe box, ice, express, gondola and hopper cars; twenty 40-ton wood gondolas for the Susquehanna & New York; 10 special steel dump cars for Whitehead Bros., New York; five 40-ton special dump cars for the Lawson Boat & Car Co.; three special wood frame pickle cars for the Lutz & Schramm Co., of Pittsburg; one special steel frame vinegar car for the H. J. Heinz Co., Pittsburg; besides orders for 82 mine cars and Lockard rotary dump cars. We are also shipping to the Philadelphia Rapid Transit Co. four steel frame construction car bodies and six wood hopper car bodies.

"We have shipped six steel hopper cars to the Cananea Consolidated Copper Co., of Arizona. These are built from designs by the writer, and, as you will note, are of 60,000 lbs. capacity, weighing 18,000 lbs. The road is 36 in. gage."

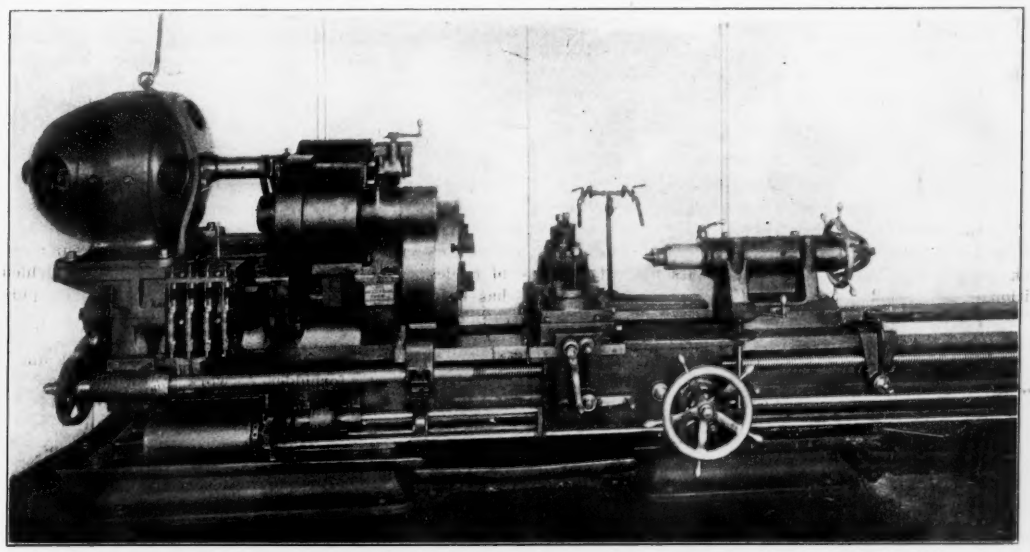
It is interesting to compare Mr. King's double hopper car with a similar car of 30,000 lbs. capacity and 15,300 lbs. weight for the same company built by the American Car & Foundry Co. and shown in the *Railroad Gazette* June 26.

A 26-Inch Rapid Production Lathe.

The accompanying engraving shows the application of motor drive to a rapid production lathe manufactured by the Bullard Machine Tool Company, Bridgeport, Conn. The machine has a 26-in. swing, a greatest distance between centers of 10-ft., and is equipped with two tool holders. As its name implies, it is designed especially for heavy work and the handling of large roughing cuts made possible through the use of self-hardening tool steel, and it has a particularly neat arrangement for contained drive. The motor, a Crocker-Wheeler 20 h.p. shunt-wound machine, is mounted in the position usually occupied by the cone pulleys on belt-driven lathes. The armature shaft is connected by a rigid coupling with a shaft carrying two pinions of different sizes, which by a lateral movement in one direction or the other, are caused to engage, one at a time, with corresponding fixed years on an intermediate shaft giving two speeds to the latter. At one end this intermediate shaft carries a spur gear which drives the lathe spindle through a large gear behind the face plate. The spindle is exceptionally long, giving a good distance between bearings and consequently a much to be desired rigidity.

The travel of the carriage may be directed and controlled at will through the hand-wheel, shown on the front, or may be operated automatically, either on the gear-driven lead-screw for heavy roughing and thread-cutting, or on the splined-shaft, which is belt-driven from the pulley on the lathe spindle, when a more rapid travel is needed. The cross-feed operates only by hand, but is arranged so that both tool rests may be simultaneously fed towards one another if two tools are being used. For moving the entire tail-stock there is an elbow extension attached to it which carries a pinion actuated by a crank-key and intermeshing with the tool-carriage feeding-rack under the front ledge of the bed. While the machine is running a continuous stream of soapy water is maintained on the tool and worked by a small rotary pump belted by two reductions from the armature shaft and arranged to draw the water from the catch-basins beneath the lathe, as indicated.

In order to secure the most economical performance of the tool at all times it is arranged to drive at various speeds according to the nature and size of the piece of work being handled. For this purpose the motor is supplied with power from a four-wire system and equipped with a Crocker-Wheeler multi-voltage speed controller which gives six fundamental speeds by the directly available voltages and six intermediate speeds between these fundamentals by a small amount of field weakening. Mechanically, these 12 speeds may be doubled by the two gear changes in the drive as already described, so that in all the tool has 24 possible speeds. The controller is mounted on the front of the lathe just below the lead screw, and is manipulated by a handle on the tool carriage through two spurs, a splined shaft and a pair of beveled gears, one of which is feathered so as to slide but not turn on the shaft. This affords the operator perfect and convenient control of the machine, to start, stop, or run it in either direction at any of its various speeds without moving himself or even his eyes away from the work.



Bullard Machine Co. Lathe with Motor Drive.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

CONTRIBUTIONS.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

ADVERTISEMENTS.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

The precedent established by the city of St. Louis in requiring the use of power brakes on all electric cars within the city limits is of considerable interest. The traffic conditions in St. Louis, as described in detail in another column, differ only in degree from those of every large city in the country. In brief, the electric lines are more convenient than the steam roads, and handle a steadily increasing proportion of the suburban traffic. They run on schedules which make but little allowance for delays, yet delays are inevitable in the congested streets. Hence the motormen, to keep their time, and, incidentally, their positions, run the cars at high speed as soon as they get on to an open stretch of track. It is only working over familiar ground to say that in the majority of cases not only in St. Louis, but everywhere, no way has been found to keep dogs, carriages and children off the tracks, and that a hand brake is an imperfect method of control for a heavy car, when an emergency stop is required. At the present time, a fair proportion of large interurban cars are fitted with air brakes. But any car, heavily loaded with passengers, which attempts to make fast time on suburban runs is liable, from time to time, to have urgent need for a power brake, and in requiring the use of such brakes on all cars, the St. Louis authorities seem to have taken a wise step toward lessening the needlessly large number of casualties on interurban electric lines. The General Manager of the St. Louis & Suburban line, elsewhere referred to, expresses great satisfaction with the use of the brakes, although there is naturally some crudeness while the apparatus is yet new, and the men have not become accustomed to its use.

There are two or three economic barometers that show clearly whether merchants are expanding or contracting their obligations, and indicate confidence or lack of confidence on the part of capital. Railroad gross earnings are often referred to, since, like a ledger, they show in brief the whole movement and output of commodities. The production of iron and steel, particularly of steel, is a valuable indication owing to reasons somewhat different. Orders for structural steel, new rails, etc., show that work of a permanent character is being undertaken; work which is characteristic of times of prosperity, such as the construction of large buildings, and extensive railroad betterments, the building of new railroads, bridges, etc. When commercial depression is imminent, much of this sort of building can be postponed, and there is hesitancy about placing new orders. The increases in output recorded by the American Iron & Steel Association, printed elsewhere in this issue, furnish excellent testimony, therefore, to the statement which the Association makes, that the prevailing low prices in the stock market do not mean an end to the extraordinary prosperity of the last few years. The increase in the total production of steel ingots and castings from 10,188,329 tons in 1900 to 14,947,250 tons in 1902 is striking. Such figures as these, in connection with the steadily advancing railroad gross earnings—99 roads recorded by the *Commercial and Financial Chronicle* showing an increase in gross of $57,465,311 for the first five months of the present year as compared with the same period in 1902—serve to correct the impression which might otherwise be created by recent sales on the Stock Exchange, that the tide of commercial prosperity is receding.

The Committee on Couplers of the Master Car Builders' Association recommended at the June convention a number of changes in the coupler specifications. Chief among these were the exclusion of the malleable iron coupler and a change in the contour lines to provide for a larger pin and greater strength in the lugs and in the knuckle hub. The report says that "The present contour was designed for very much lighter service than it is now compelled to stand and there is a limit to the additional strength that can be obtained with the present contour by improving the material in the coupler." If such changes are necessary it is time that the railroads gave some serious thought to the prevention of the abuse to their rolling stock which takes place in the yards and which is the cause of the ever increasing number of failures of couplers and draft gears resulting in serious wrecks and break-in-twos. Couplers are not broken or draft attachments pulled out as a result of stresses induced by the engine on the road. The damage is done in the yards, although it may not appear until the train is on the road and breaks in two on a stiff grade. Cars cannot be kicked into sidings and brought up sharp against a bumping post or a string of other cars at a speed of 6 or 8 miles an hour without damage, yet this is what occurs daily all over the country. The automatic coupler has done its work too well. The men no longer risk life and limb in coupling cars; they simply open the knuckle and the engineer backs up. No one is killed or hurt when the cars come together just a little too hard, and it seems to the engineer and yard men a waste of time to make easy couplings. This is the reported practice in most yards and it is plain that the use of the humane and economical automatic coupler has developed a new source of loss and danger in careless handling. There is needed as concise a set of rules and as rigid discipline for yard men as has been developed in the standard code for enginemen and trainmen. A large proportion of the wrecks caused by break-in-twos can be prevented by discipline in the yards. To give the men to understand that they are just as likely to lose their jobs if they handle cars recklessly as they were to lose their arms with the old link and pin couplers is obviously a right beginning.

The Kansas and Missouri floods again make prominent a delicate point in the Master Car Builders' Rules for Interchange, that concerning responsibility for cars away from home damaged by the "Act of God." A recent decision of the Arbitration Committee fixes the responsibility for a car destroyed by a cyclone upon the road having possession of the car at the time of destruction, in pursuance of the provision in the preface to the Rules. The preface broadly provides that damage done by accident is chargeable to the road handling the car, and the Committee ruled that damage caused by a wash-out, fire or tornado is covered by this provision. So far as can now be recalled, this question first occurred in 1896 as a result of the St. Louis tornado. It was pointed out then that the Interchange Rules impose obligations not recognized by the courts, since courts will not compel payment for damages to property destroyed by an act of God. Some of the St. Louis roads signified their willingness to repair the damaged foreign cars at their own expense. Others refused on the ground that while willing to do so, provided other roads party to the Code would do likewise in future, there was no guarantee that such costs could be collected, since redress was not obtainable in the courts. The roads finally came to an understanding without appealing to the Arbitration Committee; the owners of damaged cars agreeing to stand the costs. There will be many similar cases based on damage or destruction of cars in the recent floods, and we understand that agreements are being arranged on a basis similar to the St. Louis settlement.

Whistle Signals.

The enforcement of an exact compliance with the methods of giving locomotive whistle signals is a subject of comment by a Boston correspondent in another column. It is probable that instances are rare indeed when either trainmen, stationmen or yardmen misunderstand whistle signals, however slovenly they are given. It is quite like the reading of bad hand-writing or the taking from the sounder of a telegraph message sent by an extra fast operator. The worse the hand-writing and the greater the speed of the sounder the more careful the reader is in getting the meaning. Nevertheless there is no need for haste or slurring or slovenliness in giving whistle signals; there is plenty of time. The code prescribes just how they should be given; and while there is, therefore, no excuse whatever for lack of precision, there are at least two reasons for insisting upon neatness and accuracy.

Employees have little perspective; they may know—probably most of them do know, in a way—the meaning of each rule designed to secure safety; but their judgment as to the relative importance of these rules cannot be trusted, and for that reason no laxity can be permitted in the execution, by any employee, of any safety precaution. It is well in handling all large bodies of men to teach the habit of something like blind obedience to orders; that refinement of discipline which Napoleon instilled in his army—obedience to orders because they are orders and without thinking of the result of such obedience.

Few employees of a railroad notice the precision and accurate spacing of the two long and the two short whistle signals for a crossing which our correspondent refers to. They are apt to know that this signal is expected and the manner of its execution makes little impression on their minds. Indeed the variations in the execution are apt to convey some additional information. It is not difficult to distinguish between the careful spacing and distinct beginning and ending of each blast as sounded by a careful and competent runner early in a run, as compared with the rising and falling notes, due to changing volume of sound, of the slow freight whose engineman has been on duty for long hours. But while a crossing signal may, perhaps, in all cases, be safely slurred, it might occur that slovenliness in giving the one long and two short blasts calling attention to the fact that the train is carrying flag or lantern signals, showing that it is followed by another section, might give wrong information and possibly cause an accident.

Neatness and precision in the performance of any railroad duty has an educational effect on the mind of the employee. The action of pulling the whistle cord is purely mechanical and when any engineman has once learned the right way, he will, if he has the qualities necessary for a good engineman, continue to do it in the right way forever. It is in recognition of this mental habit that trainmasters on some roads use a buzzer or other electro-magnetic noise maker to teach enginemen precision in whistle signaling.

This subject, like nearly every detail of railroad operation, resolves itself into a question of the most economical use of men and material. The greatest economy is got when the division of labor is such that low priced men do low priced work and high priced men do high priced work. Experience shows that there is a large available body of men in this world with that peculiar habit of mind which enables them to perform duties which are clearly fixed in their minds for an indefinite number of times without error. From such men very little work requiring judgment should be demanded and, also, such men should be carefully protected as to their hours of duty. In Mr. Love's article on discipline, July 17, he quotes the following instance: "An engineman was told bluntly that he had lied about a collision. His reply was 'I guess I did.' There had been no wilful lie at all. The movements previous to and up to the moment of the crash had made no mental impression and his reasoning and deductions were erroneous." Within the writer's knowledge, during the past fortnight, a similar butting collision occurred and the engineman and conductor of the train causing the collision frankly admitted they had forgotten their orders. They had been on continuous duty for 24 hours. These are simply instances of bad handling of good men, for which the operating officer was morally responsible.

The sum of it is that wherever there are flexible rules judgment is required, and this is high priced. It is better business to so divide all railroad work that the thinking is done by the boss and the execution of orders is as rigidly automatic and precise as possible.

June Accidents.

The condensed record of the principal train accidents which occurred in the United States in the month of June, published in this issue, contains accounts of 28 collisions, 20 derailments, and 2 other accidents. Those which were most serious, or which are of special interest by reason of their causes or attending circumstances, occurred as follows:

	Killed.	Injured.
†3d, Wedgefield, S. C.	5	32
†4th, Stilwell, Kan.	9	5
†18th, East St. Louis, Mo.	1	7
19th, Raymond, Iowa	10	..
†21st, Point Reyes, Cal.	2	28
22d, Spokane, Wash.	3	8

The engineman who failed to heed the warning in the Wedgefield case very likely thought that he was adhering strictly to the spirit of the regulations. Presumably the warning was given with sufficient vigor to bring it within the meaning of the rule requiring trains to be stopped for "anything waved violently" on the track; but we do not know. Signals which merely indicate that some one wishes to board the train are often given with ridiculous violence; so that, at this distance, and in the absence of a judicial inquiry, the responsibility for this disaster can only be conjectured. Railroaders who have made serious errors of omission will have some appreciation of the engineman's feelings. The Stilwell and Raymond collisions killed, together, 19 persons, and injured 10 or more. The causes of both come within a class that is very common. To prevent such collisions something quite uncommon is needed; or, at least, would certainly seem to be warranted by such large losses of life and property. Yet the record goes on growing, month after month, and remedial measures, if taken, are so mild and inconspicuous that they are seldom heard of. On railroads or sections of railroad where traffic is heavy, automatic block signals are being introduced with considerable energy; though not, we think, so fast, in proportion to the needs of the business and to the funds available, as improvements are usually made in other things, such as rails, bridges, engines and cars. But on lines which are less crowded, like those where these two collisions occurred, the introduction of the block system seems to make slow progress, though the cost of installation of apparatus is far less than for automatic signals. Even on some roads where the block system is ostensibly in use, its benefits are only partially availed of; for disastrous butting collisions occur, now and then, indicating that, with some railroad officers, the term "block system" means the protection of passenger trains from rear collisions, and nothing more. To provide the men and facilities for blocking, and then to run a good part of the trains on the same plan as though the facilities did not exist, is a good deal like owning a horse and going afoot—only very much worse.

The derailment at Point Reyes is unexplained. The newspaper accounts are quite explicit in saying that the engineman was making his second trip over the road, depending on the fireman to tell him how to run, and that, approaching (on a curve) the trestle where the disaster occurred, he was running at unduly high speed. On the train were many prominent citizens of San Francisco returning from a funeral at Tomales.

The disaster at Spokane on the 22nd will be a notable one in the annals of the company which bears the loss, by reason of the great destruction done. It is somewhat like the accident on the same road at Nyack, Montana, in August, 1901, when 31 persons were killed. The derailing switch or "throw-off," to be fixed at the lower end of a side-track, to ditch cars that start to run away, is a simple and humble device, but exceedingly useful. In England, as long ago as 1892, 20,217 out of 20,823 side tracks were supplied with this apparatus, thus affording to passenger trains a constant protection, the value of which can scarcely be estimated. And the need of such derailing switches in America was as clearly to be seen in 1892 as in 1903.

A train accident which does not appear in our record, but which is worthy of mention, was the destruction of a carload of gunpowder in a freight train on the Baltimore & Ohio near Parkersburg, W. Va., on the 25th. The car was next to the engine and it caught fire in some way. Engineman G. A. Duval stopped the train, had the car detached from those behind it, hauled it forward about one mile, then detached his engine and went forward a safe distance beyond, and then waited for the explosion.

At Tecoletes, Mexico, June 8, a car in a freight train, containing dynamite, took fire and was blown up. Many other cars were wrecked and six men were killed.

The newspapers report 20 electric car accidents in the United States in June, in which 11 persons were killed and 116 were injured.

Transport, our interesting English contemporary, has just celebrated its 12th anniversary by issuing the largest single number in its history, 60 pages of reading matter and 40 pages of advertisements. Among the notable articles is one by Professor Emory R. Johnson, of the University of Pennsylvania, on Government Regulation of Railroads, on which subject Professor Johnson is soon to issue a book. Illustrated articles are given on an interesting variety of English railroad topics, including a new high level bridge over the Tyne, new docks at Cardiff and Southampton, and some beautiful scenery in Northeastern England. On autocars there is an article, adorned by a vignette portrait of its author, Mr. Norman B. Macdonald, with enticing symptoms of a rich regalia which suggests kilts below, but not shown because of the exigencies of space. There are descriptions of new express locomotives for the South-Eastern & Chatham, the North British and the Caledonian; of electric traveling cranes at the Manchester ship canal docks, fireproof wire glass, etc. Readable descriptions are given of a new 50-mile light railroad in Ireland, subsidized by the Government, of a new mountain railroad in Switzerland, the Great Central Railway Company's hotels, and a score of other things. The enterprise of the editor of *Transport* is not only vigorous but constantly expanding; a combination of Yankee liveliness and English thoroughness.

NEW PUBLICATIONS.

Railway Legislation in the United States. By B. H. Meyer, Ph. D., Professor of Institute of Commerce, University of Wisconsin. New York: The Macmillan Company, 1903. 329 pages, 5 x 7 in. Price $1.25.

Professor Meyer says in his preface that the aim of the volume is to present a condensed analysis of the private and public laws which govern railroads in the United States and of the important decisions relating to interstate commerce. Statements and comments are based upon actual analysis and in large part upon analytical tables of charters and laws enacted in the various States. Starting with introductory comment on the general significance of railroads, their beginnings, extent and status in different countries, the whole scheme of American railroad legislation is reviewed in brief. Typical charters are given and the laws relating to charter and the incorporation of new companies are condensed in such a way as to show the differences which exist in different States of the Union. American railroad legislation has resulted in the enactment of some very cumbersome and complicated laws, and Professor Meyer calls attention to the fact that in legislation to prevent pooling, to maintain competition, to control rates, etc., the objects chiefly sought for have not been attained. The work of the Interstate Commerce Commission throughout the period of its existence is reviewed and there is also a chapter on the reviewal and frequent reversal by the Supreme Court of the United States of the decisions of the Commission. Professor Meyer thinks well of the Interstate Commerce Commission, holding that, on the whole, it has done a great work; though it is true that under present circumstances the Commission—to paraphrase the words of a critic of the old Articles of Confederation—can recommend everything but do nothing. At the end of the book is an appendix containing in full the charter of the Baltimore & Ohio as a typical illustration of an American charter; also characteristic articles of incorporation under General Laws, the Massachusetts Railroad Commission law and the Act to Regulate Commerce. The book is valuable as a work of reference in that it gives in condensed form the different State laws covering nearly all important matters of railroad legislation, and these are so arranged and indexed as to admit of ready comparison.

TRADE CATALOGUES.

The Stanley Electric Manufacturing Company, Pittsfield, Mass., has issued Bulletins Nos. 133, 134 and 135. Number 133 describes the S. K. C. circuit breakers with independent opening action. Bulletin 134 deals with engine type railroad generators and points out in detail the several important features of this type of apparatus. Number 135 describes the line of instruments made by the S. K. C. Company. Special reference is made to the hot wire voltmeters and ammeters and advantages of this construction over other makes are discussed at length. The catalogues are got up in the usual artistic and convenient form.

The Joseph Dixon Crucible Co., Jersey City, has issued a folder entitled "Colors and Specifications," giving paint specifications for the construction and also for the maintenance of steel and iron work, and showing the olive green, natural, dark red and black tints made by the company. The black is specially prepared for steel smokestacks, boiler fronts, ornamental iron work, and surfaces subjected to sulphurous fumes. Five photographic reproductions are shown of large structures painted with different shades of Dixon's Silica Graphite paint.

The Garry Iron & Steel Co., Cleveland, Ohio, has issued a 32-page catalogue illustrating various sizes and forms of pneumatic, electric and hand power cranes. Some of the cranes shown are stationary; others are mounted on turntables and trucks operated by hand, or by electric power. Standard pneumatic car jacks, with hand trucks; pneumatic painting machines, straight lift hoists, dolly bars, etc., are also illustrated.

The American Tin Plate Co., New York, has sent out an attractive little book under the title "A Fifty Year Roof." The object of the book is to acquaint the building trade with the merits of terne plates for roofing material. It contains a short history of the manufacture of tin and lead and tin plates, and much useful information and data for estimating in building work.

The Wyckoff Pipe & Creosoting Co., Stamford, Conn., has just published a small pamphlet in which are described a number of uses for creosoted timber. This company's works are at Portsmouth, Va. It makes a specialty of timber conduits for underground wires, telephone and telegraph poles and cross arms, piles and lumber.

Train Accidents in the United States in June.[1]

unx, 2d, International & Great Northern, Hunter, Texas, passenger train No. 4, running at high speed, was derailed, every car going off the track; but, according to the reports, no car was overturned and no person was injured.

eq, 3d, Rock Island & Peoria, Alta, Ill., a passenger train was derailed by the breaking of an axle and the cars were ditched. Three passengers and two trainmen were injured.

†unf, 3d, Atlantic Coast Line, Wedgefield, S. C., a passenger train was derailed at a washout, the engine falling into a great chasm which had been made in a high embankment as the result of a cloud burst. The cars of the train were heavily loaded with passengers, negroes going to a college commencement; and four passengers and one trainman were killed and 29 passengers and three trainmen were injured. The train was signaled by a negro who had seen the destruction of the track, but the engineman disregarded the signal because it was given at or near a flag station at which the train was not required to stop.

†bc, 4th, 3 a.m., Missouri Pacific, Stilwell, Kan., butting collision between passenger trains of the Atchison, Topeka & Santa Fe, No. 4 northbound and No. 1 southbound, each train consisting of nine cars. The trains were using the Missouri Pacific track in consequence of the obstruction of the Atchison line by floods. Seven passengers and two tramps were killed, and five passengers were injured. The passengers who were killed were in the chair car of the southbound train.

bc, 4th, Texas & Pacific, Jefferson, Texas, butting collision of passenger trains, wrecking both engines and three express and mail cars. Seven passengers and four trainmen were injured. It is said that conflicting meeting orders had been issued by the despatcher.

unx, 4 a.m., Tennessee Central, Daysville, Tenn., a passenger train was derailed and the engine fell down a bank. Three trainmen were injured.

unf, 7th, Oregon Railroad & Navigation Line, Latourelle, Ore., a passenger train was derailed by a spike on the track, which doubtless had been placed there by boys, and the engine and tender fell down a bank into the Columbia River. The engineman and fireman escaped injury.

unx, 8th, Gulf, Colorado & Santa Fe, Helbig, Texas, a work train was derailed and ditched and the engine was overturned. The engineman and fireman were injured, the former fatally.

bc, 8th, Southern Railway, Fort Hill, S. C., butting collision between a passenger train and a freight, both engines being wrecked and thrown down a bank. One mail car and six freight cars were wrecked. One engineman and two mail clerks were injured.

unx, 8th, Baltimore & Ohio, Berry's Siding, W. Va., a freight train, drawn by two engines, was derailed, and both engines and several cars were wrecked. One engineman and one fireman were injured.

*8th, Cleveland, Cincinnati, Chicago & St. Louis, North Vernon, Ind., a number of cars of a freight train, which had broken away at the rear and had run back down grade, collided with a following freight train, and three trainmen were injured. Eight cars were wrecked.

unx, 9th, Louisville & Nashville, Muldraugh's Hill, Ky., the locomotive of a passenger train was derailed and fell down a high bank. The first three cars were also ditched and three others were derailed. The fireman was killed. A rail of the track penetrated the smoking car and injured a passenger badly. Five other passengers and seven trainmen were injured.

bc, 10th, 8 p.m., Southern Railway, Ravensworth, Va., butting collision of freight trains, wrecking both engines and several cars. Three trainmen were injured.

xc, 10th, Pennsylvania road, Osceola, Pa., collision of freight trains; three trainmen killed and four injured; one engine and 12 cars were wrecked. It is said that the collision was due to the foremost train becoming uncontrollable while ascending a grade; one engine and 14 cars ran back into the head of the following train.

unx, 10th, 1 a.m., Houston, East & West Texas, Burke, Texas, a freight train was derailed and six cars fell off a bridge and were wrecked, together with most of the bridge. Four trainmen were injured.

*bc, 11th, Southern Railway, Stokesland, Va., butting collision of freight trains, wrecking both engines and 17 cars. The wreck took fire and the combustible portion of it was mostly burnt up. Five trainmen were injured.

†xc, 11th, Seaboard Air Line, Skelton, Va., collision between a local passenger and a freight train, overturning one engine and wrecking eight cars. A passenger on the freight was fatally injured and one of the enginemen was hurt.

o, 11th, 1 a.m., Southern Pacific, Keene, Cal., the locomotive of a freight train was wrecked by the explosion of its boiler and the fireman was killed. The engineman was badly scalded.

dr, 15th, Southern Pacific, Iowa, La., a freight train was derailed at a defective switch and the engine and several cars were wrecked. The engineman and fireman were fatally injured.

†rc, 18th, 11 p.m., Terminal Railroad Association (east approach to the Eads bridge) East St. Louis, Ill., a passenger train of the Illinois Central was run into at the rear by a following passenger train of the Cleveland, Cincinnati, Chicago & St. Louis, and two cars of horses at the rear of the foremost train were wrecked. The owner of one of the horses riding in the car was killed, and seven persons were injured.

unx, 18th, Atchison, Topeka & Santa Fe, Blackwell, Okla. T., a passenger train was derailed and ditched; the engineman was killed and the fireman injured.

bc, 19th, 3 a.m., Illinois Central, Raymond, Iowa, butting collision between an eastbound passenger train and a westbound freight. The passenger train was running at high speed and the wreck was a very bad one. Six trainmen and four other persons, apparently tramps, were killed and several passengers were injured. The conduc-

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[1] Accidents in which injuries are few or slight and the money loss is apparently small, will as a rule be omitted from this list. The official accident record published by the Interstate Commerce Commission quarterly is regularly reprinted in the *Railroad Gazette*. The classification of the accidents in the present list is indicated by the use of the following

ABBREVIATIONS.

rc	Rear collisions.
bc	Butting collisions.
xc	Miscellaneous collisions.
dr	Derailments; defect of roadway.
eq	Derailments; defect of equipment.
dn	Derailments; negligence in operating.
unf	Derailments; unforeseen obstruction.
unx	Derailments; unexplained.
o	Miscellaneous accidents.

An asterisk at the beginning of a paragraph indicates a wreck wholly or partly destroyed by fire; a dagger indicates an accident causing the death of one or more passengers.

tor and engineman of the freight made a mistake in reading a train order; they overlooked the number indicating the section in the description of the passenger train.

bc, 20th, 3 a.m., Delaware & Hudson, Dresden, N. Y., butting collision between a southbound freight train and a northbound empty engine, wrecking both engines and many cars. Four trainmen were killed and two others were injured. The empty engine was running as the second section of passenger train No. 7, and it is said that the men on the freight failed to observe the signal carried by first No. 7.

bc, 21st, Missouri, Kansas & Texas, Greenville, Texas, butting collision of engines in the yard, badly damaging both engines. One fireman was killed.

xc, 21st, Missouri Pacific, Cole Junction, Mo., collision of freight trains at a junction, wrecking one engine and several cars. Two trainmen and two tramps were killed and two trainmen were injured, one of them fatally.

†unx, 21st, North Shore Railroad, Point Reyes, Cal., a passenger train was derailed while running at moderate speed over a curve, and the single passenger car, in which were 37 passengers, fell off a bridge about 8 ft. high, carrying the tender with it. The coach was wrecked; two passengers were killed and 28 injured.

bc, 22d, Atchison, Topeka & Santa Fe, Los Cerrillos, N. Mex., butting collision between a freight train and a work train, wrecking both engines and many cars. One fireman was killed and many other employees were injured.

xc, 22d, Union Pacific, Rawlins, Wyo., eight freight cars escaped control while being switched and ran at high speed down grade about four miles and collided with a westbound freight train. Three trainmen and a tramp were killed.

22d, 4 a.m., Great Northern, Spokane, Wash., a train of 73 freight cars, 65 of them loaded, which had escaped from a siding at Hillyard and had run uncontrolled at very high speed down a long grade, ran off the end of the track at Division street, near the freight station, and over 40 cars were wrecked or badly damaged. Only 19 were undamaged. Near the end of the track five empty cars were standing. These, with a dwelling house and one other building, were demolished by the runaway train. Of the occupants in the dwelling house one was killed and three slightly injured; two tramps sleeping in a car were killed and one injured. On Sunday night, a half hour before this accident occurred, the fire alarm and watchmen's wires at Hillyard were cut, and a box car in the yard was set afire. These, and other incidents, led to the belief that the brakes on the cars had been maliciously loosened. At least 30 of the cars had been left with their hand brakes set. It is also believed that a part of the train was liberated and allowed to run some distance before the second part was started.

bc, 23d, Seaboard Air Line, Southern Pines, S. C., butting collision between freight train No. 6 and an empty engine, making a bad wreck. Both enginemen were killed, and several other trainmen were injured. The runner of the empty engine (who was killed) appears to have fixed his mind on train No. 66, and to have overlooked No. 6.

bc, 23d, Illinois Central, Dawson, Ky., butting collision between southbound freight train No. 151 and northbound freight train No. 196, both running at good speed. Three trainmen were killed or fatally injured.

dn, 23d, Wabash road, Peru, Ind., eastbound passenger train No. 6 was derailed at a point where the track was being repaired, and the engine and all of the cars ran a considerable distance on the sleepers. A freight car on a side track was damaged. Reports state that the passengers and trainmen all escaped serious injury.

unx, 23d, 10 p.m., St. Louis, Iron Mountain & Southern, White Oak, Ark., a freight train was derailed and the engine and five cars were ditched. Two trainmen were killed and a third was injured.

bc, 24th, Missouri, Kansas & Texas, Peck Siding, Ind. T., butting collision between southbound passenger train No. 1 and northbound passenger train No. 102, second section. The trains had been ordered to meet at Peck and the freight was backing into the side track when the collision occurred. Both engines were badly wrecked. Two trainmen were injured.

xc, 24th, Southern Pacific, Oakland, Cal., an empty engine, which became uncontrollable while running through the yard, collided with a freight train, badly damaging itself and killing its fireman. The fireman, who was killed, is supposed to have deliberately started the engine on the main track in the face of an approaching passenger train.

dr, 24th, Missouri Pacific, Flat Rock, Ark., a trestle bridge broke down beneath a freight train and the engine and several cars fell to the stream below. The engineman and one fireman were killed and another trainman was injured.

24th, North Shore road, Tocaloma, Cal., the locomotive of a passenger train was derailed and wrecked; the engineman was killed and the fireman injured.

unf, 26th, 10 p.m., Norfolk & Western, Marion, Va., passenger train No. 13 was derailed by running over a cow, and the engine was ditched. The first three cars derailed were badly damaged. The engineman and fireman were killed and two other trainmen were injured.

o, 26th, Lehigh Valley, Looneyville, N. Y., the locomotive of a passenger train was badly damaged by the breaking of a side rod; the fireman and a boy riding in the engine were killed.

xc, 27th, 4 a.m., Cincinnati, New Orleans & Texas Pacific, Chattanooga, Tenn., collision of switching engines; one engineman fatally injured.

xc, 27th, Atlantic Coast Line, Dunlop, Va., a passenger train ran over a misplaced switch and into the head of a freight train standing on the side track. The engineman and fireman of the passenger train were killed and several passengers were injured.

28th, 9 p.m., Cincinnati, New Orleans & Texas Pacific, Burgin, Ky., a freight train ran into the rear of a preceding freight, wrecking the engine and several cars. The engine fell down a bank, and the wreck took fire and was mostly burnt up. The fireman was fatally injured.

rc, 29th, 2 a.m., Southern Railway, Caswell, Tenn., passenger train No. 30, which had been unexpectedly stopped, was run into at the rear by a following freight train, and the rear car of the passenger train was wrecked. This was a mail car. It took fire from the engine and was burnt up. Five passengers were injured.

rc, 29th, Uniondale, Pa., a passenger train of the Erie ran into the rear of a freight train of the Delaware & Hudson, wrecking the engine of the passenger and two engines at the rear of the freight, and badly damaging several passenger cars. Six passengers and four trainmen were injured.

rc, 29th, Pittsburgh, Fort Wayne & Chicago, Lucas, Ohio, passenger train No. 105 ran into the rear of a preceding passenger train, the Chicago Limited, wrecking the rear car of the leading train. One passenger was injured.

bc, 29th, Baltimore & Ohio, Buckhannon, W. Va., butting collision of freight trains, wrecking both engines. One fireman was killed and several other trainmen were injured.

eq, 29th, 3 a.m., Pennsylvania road, New Brunswick, N. J., a freight train was derailed by the breaking of an axle and 15 loaded cars were wrecked. All four main tracks were blocked for many hours and a temporary track had to be built around the wreck.

bc, 30th, 8 p.m., Baltimore & Ohio, Maynard, Ohio, butting collision of freight trains, one of which had disregarded a meeting order; both engines and several cars were wrecked. One fireman was killed and three other trainmen were injured.

unx, 30th, 11 p.m., Chesapeake & Ohio, Big Island, Va., a freight train was derailed and 10 cars were wrecked. Two men stealing rides were killed.

30th, Southern Railway, Luke, Ga., a freight train was derailed at a switch which had been tampered with, and the engine was overturned. The engineman and fireman were injured.

TECHNICAL.

Manufacturing and Business.

The Emmert Manufacturing Company of Waynesboro, Pa., makers of vises, will build a foundry in connection with its present shops.

A. L. Humphrey, Superintendent of Motive Power of the Chicago & Alton, has resigned and will take a position with the Westinghouse Air-Brake Company on August 1st.

At the South Side shops of the St. Louis & San Francisco in Springfield, Mo., a new department is being added to make car and locomotive springs. Machinery is now being put in.

Thomas A. Gillespie has been appointed Receiver of the Southern Car & Foundry Company, which operates shops at Gadsden and Anniston, Ala., and at Memphis and Lenoir City, Tenn.

Reports state that the Standard Steel Car Company is to spend $500,000 in enlargements at Butler, Pa. The daily output of the plant will be increased from 60 to 80 cars when the improvements are completed.

The Mexican Car & Foundry Co. is to build shops at the City of Mexico, covering 45 acres, at a cost of $500,000 gold. Isaac M. Hutchison, the Mexican representative of the St. Louis Car Co., American Locomotive Co., etc., is interested.

The Chicago Car Wheel & Foundry Co., successors to the Fort Wayne Foundry & Machine Co., which was recently reorganized, is now located on the Chicago Junction R. R., in the city of Chicago, the shops having been removed from 47th street.

The Brown & Zortman Machinery Company, of Pittsburg, has opened an office and storeroom at The Bourse, Philadelphia, for the accommodation of its eastern customers. At this office the company will have on exhibition Colburn boring and turning mills and Universal saw tables, as well as its other tools. The office will be in charge of Mr. R. G. English.

Reports state that the Pittsburg Railway Supply Co. has been incorporated with a capital of $1,000,000, by Frederick G. Wood, Charles R. Burchheit, James B. Crooks, G. W. McLean and William J. East, all of Pittsburg, Pa.; Eugene Gough, Charles W. Pimper, Charles P. Ravenburg, Anthony J. Galeski, Fred A. Ray, and George W. Nash, all of the District of Columbia.

Reports state that the Davies Car Wheel Co. will build its shops at Moundsville, W. Va. The organization of the company was completed last week, when the following were elected directors: A. S. List, J. N. Vance, C. L. Sanford, of Bellaire; W. W. Smith, Moundsville; W. D. Alexander, Moundsville; F. J. Hearne, Pittsburg; W. H. Bradley, W. E. Stone and Geo. A. Laughlin. The officers are: W. H. Bradley, President; A. S. List, Treasurer, and J. F. Adams, Secretary.

The Lunkenheimer Company, of Cincinnati, gave its employees an outing on Saturday last, which required two passenger trains of 10 cars each. The party went to Woodsdale Island Park, on the Cincinnati, Hamilton & Dayton, 31 miles. The number of employees participating was about 700, and, with their families, they made a company of about 2,000. The Lunkenheimer Company furnished not only the transportation, but the music, refreshments and all the usual accessories of a picnic.

Iron and Steel.

It is reported that the United States Steel Corporation has secured control of the Clairton Steel Company.

The Cramp Steel Co. is making preparations for the manufacture of wire rods on an extensive scale at its plant in Collingwood, Ontario.

The American Bridge Company has received a contract to build a 550-ft. steel double-track, pin-connected bridge over the Kansas River for the Union Pacific at Kansas City, Kan.

The York Bridge Company, York, Pa., has just received contracts to rebuild six bridges for Frederick County, Md., at a little over $12,000. The spans range from 50 ft. to 125 ft.

A despatch from Austin, Texas, says that the Colorado Fuel & Iron Company is behind the project to establish an iron and steel furnace at the mouth of the Balsas River on the Pacific coast of Mexico. R. Sprague, of Denver, Colo., is said to have acquired in behalf of that company extensive iron ore deposits situated near the proposed site of the plant.

Officers of the United States Steel Corporation estimate that the total production of rails in the United States this year will be 2,950,000 tons. This is in excess of estimates heretofore made, and is based on the theory that the Lackawanna Steel & Iron Company, which will begin rail making in October, will turn out not less than 150,000 tons by December 31.

Reports just published show that $1,098,360 was paid by the Canadian government in iron and steel bounties during the year ended June 30 last. The Dominion Iron & Steel Co. received $499,626 on steel ingots and $386,338 on pig iron. The Nova Scotia Steel & Iron Co. received $79,858 on steel ingots and $38,974 on pig iron. The Hamilton Steel & Iron Co. (which is, according to rumor, about to be absorbed by the United States Steel Corporation), received $90,915 on pig iron, $36,792 on steel ingots, and $8,406 on puddled iron bars.

Lake Pend O'Reille Bridge.

The Northern Pacific has completed the substructure for the bridge over the arm of Lake Pend O'Reille, to take the place of the wooden bridge in use hitherto. There will be 92 steel spans, resting on piers of solid masonry now completed. The grade will be 4 ft. higher, and the cost of the bridge will be about $350,000.

Southern Railway Shops at Louisville.

The shops to be built by the Southern Railway in that part of Louisville, Ky., known as Youngstown, are not very extensive but will afford adequate division shop facilities for the Louisville-St. Louis lines. No contracts have been let, but the work is being done by the company's forces. Tracks are being put in, and an oil and storehouse is being built. It will probably be a year before the roundhouse and machine shops are begun. The shops, when completed, including the yard, will cost about $100,000.

Metal Sheet Piling.

A new design of metal sheet piling has lately been patented by Mr. Henry Wittekind, of Chicago. It is made of standard rolled plates and beams, and though the sizes of beams and plates, and the thickness of the metal depend entirely upon the character of the work, for general practice 4-in. Z-bars, 6 in. x 3½-in. angles, and 18-in. wide plates, all ⅜-in. thick, are used. Corner returns are readily formed, also curved structures. To render a structure water-tight, wooden strips, rectangular in section, are placed in the corners on the exposed side, being held in place by short lengths of Z-bars, provided with slotted holes to permit adjustment. The piling is made by the H. Wittekind Interlocking Metal Piling Co., 218 La Salle street, Chicago.

Enlargement of the Gisholt Plant.

The Gisholt Machine Co., Madison, Wis., has recently increased its capital stock to $750,000. Up to the present time this company has confined itself almost entirely to making the "Gisholt" lathe, which includes several varieties and sizes. The increasing business in the lathes necessitated an enlargement of manufacturing facilities, and additions to buildings and equipment, which will double the former capacity of the plant, have recently been made. Other types of machine tools are to be made in the enlarged plant, though it will continue to make "Gisholt" lathes principally. Other new buildings are in contemplation, contracts having been let for a large foundry, with all modern appliances. When contemplated additions are completed large boring mills will be built.

Aluminum Solder.

Inventors have long been trying to discover a practical method of soldering aluminum. A number of people think they possess the secret, and there is not a factory using this metal which has not its process of soldering, but up to the present no really satisfactory process has been discovered. The following method is employed by Messrs. Nield & Campbell, who say that it gives a strong and durable joint between two pieces of aluminum or alloys of that metal. The solder is made up as follows:

	By weight.
Zinc	90 per cent.
Aluminum	5 per cent.
Antimony	5 per cent.

The solder is still stronger if 8 per cent. of antimony and 87 per cent. of zinc is used. The aluminum is first melted in a crucible and the zinc added gradually; when the latter is melted the antimony is put in and the alloy mixed intimately with salammoniac. When the surface of the molten metal is clear and white, the slag is removed and the solder cast in bars. The surfaces to be soldered are first cleaned with acid and then coated with solder, care being taken that the latter penetrates the surface of the metal under the action of the fire without its being burnt. The pieces are then brought into contact and heated; the excess of solder is removed while still liquid and the whole is allowed to cool.

American Machinery in Japan.

Last week we published an abstract from a report of the United States Consul at Kobe, Japan, giving a list of some of the American exhibitors at the Osaka Exposition. Amongst other American products shown are: Car and locomotive replacing, bridge and truck jacks, A. O. Norton, Boston, Mass.; gas forges, and gas furnaces for annealing, assaying and rivet heating, American Gas Furnace Co., New York City; bearing metals, Hoyt Metal Co., St. Louis, Mo.; shovels, Wyoming Shovel Works, Wyoming, Pa.; water meters, Pittsburg Meter Co., Pittsburg, Pa.; circular saws, ratchet drills, yoke mandrils, emery stands, mixer swages, side files, the James Ohlen &

Sons Saw Mfg. Co., Columbus, Ohio; saw mills, De Loach Mill Mfg. Co., Atlanta, Ga. The display is under the supervision of E. H. Hunter & Co., one of the largest and most important concerns in Japan, representing the American Machinery & Export Co., of New York City. It was intended to include in the exhibit a full line of pneumatic tools made by the Standard Railway Equipment Co., St. Louis, Mo., and underfeed stokers made by the Underfeed Stoker Co. of America, Chicago; but instead, visitors to the Exposition are taken or directed to the Kure dock yards and the new plant of the Osaka Electric Light Co., where recent complete installations may be seen in regular service.

A Direct Reading Dynamometer.

An account of a new direct reading dynamometer invented by Messrs. Gaiffe and Gunther has been recently given to the French Academy of Science. This apparatus consists of two discs mounted on a shaft transmitting the power to be measured. Each disc carries a metallic sector covering about 180 deg. of its surface. The sectors have an electrical connection and have brushes bearing on them so that when the shaft rotates without transmitting any power the brush on one sector leaves it just as the other brush comes in contact with its sector. The torsion of the shaft when power is transmitted alters the relative position of the sectors so that both brushes are in contact with their respective sectors. The duration of this simultaneous contact is proportional to the angle of displacement of the sector, which is proportional to the torque transmitted. If the brushes are put in circuit with a constant source of potential and an ammeter which has no self induction the mean current will be proportional to the time of contact of the brushes with their sectors, that is to the torque transmitted, so that the instrument can be calibrated to give direct readings of the torque. If, however, the potential is not taken from a constant source but is made proportional to the speed the galvanometer reading will not be proportional to the force but to the power transmitted, and the instrument can be calibrated directly in horse-power.

Hall Electro-Gas Signals on the Union Pacific.

The Union Pacific Railroad Company has awarded to the Hall Signal Company the contract for the installation of automatic block signals on its line between Archer and Buford, Wyoming, an aggregate of 33 miles of double track and four miles of single track. Of the double track to be signaled, 19 miles, between Archer and Borie, is in operation, but from Borie to Buford grading and slight changes in the alinement are under way, and it is expected to have this extension completed within the next two months. Between Archer and Buford there will be 70 single semaphore signals, three double semaphores, seven single-arm bracket post semaphores, and four double-arm bracket post semaphores, all electro-gas. The tracks will be divided into 186 track sections, and there will be protection for 71 switches. All switches are to be equipped with indicators and the whole installation is to be made under the normal danger arrangement of circuits. The conditions under which this installation will be made are about the same as on previous installations, except that in cuts it is proposed to build caves for housing the batteries, and combination wood and iron boxes will be used for housing relays. The grade from Archer to Buford is ascending, and the ruling grade of the division is from Cheyenne west to Buford, which is within the limitations of the signal installation.

THE SCRAP HEAP.

Notes.

Passenger trainmen of the Chicago & North Western have been notified that they must wear their full uniform when on duty, even in hot weather; but the vest may be a thin white one. Soft collars must not be worn.

On the quadruplex telephone circuit between New York and Scranton the Delaware, Lackawanna & Western now uses the Yetman transmitting typewriter. The officers of the road report great satisfaction in the use of the new machine.

California papers say that the Atchison, Topeka & Santa Fe is now carrying all of its fruit shipments to the East in cars of its own, practically none being carried in cars of the private car lines. The aggregate quantity of citrus fruit thus far shipped this year indicates a movement much larger than in any previous year.

At a meeting of the Southern Lumber Manufacturers Association, at St. Louis, last week, the complaint was almost unanimous, from dealers west of the Mississippi River, that the congestion of traffic on the railroads, hindering the movement of lumber, which formerly occurred only during the rush of cotton or grain shipments, is now chronic.

Press despatches say that the Chicago & Alton has increased the pay of trainmen 12 per cent. and 15 per cent., and in some cases more than this, the basis being about the same as that of the increase on the Illinois Central, announced last week. The New York, Ontario & Western has increased the pay and modified the working regulations of its telegraph operators.

The railroads centering in Boston united last week in suits for injunctions against a number of ticket brokers in that city to forbid their dealing in reduced rate tickets sold to conventions which were held in Boston. Similar action was taken at Atlanta, Ga., against brokers in that city to forbid their dealing in tickets issued on account of the Baptist Young People's Union.

The Southern Pacific is to equip its telegraph line between New Orleans and El Paso with telephones, bought of the Stromberg-Carlson Telephone Mfg. Co., of Chicago. The railroad company is now putting up copper wires between the cities named. It is proposed to have telephones at section masters' houses, at all engine terminals and headquarters of work trains, as well as at every side track where there is no telegraph operator.

Railroad officers at St. Louis say that the movement of freight in and out of St. Louis is still greatly hampered, the effects of recent floods being still felt severely by most of the railroads. Delays of from four to six weeks have occurred on many shipments of freight. Several miles of track on the east side of the river were destroyed by high water, and much of this has yet to be replaced. In most instances the replaced tracks will be on a higher grade in order to place them out of danger from future floods.

Injunction Against Low Coal Rate on C. & O.

On petition of the Interstate Commerce Commission, the United States Circuit Court in Virginia has temporarily enjoined the Chesapeake & Ohio Railroad from carrying coal or other traffic at other than its published tariff rates. This suit is brought under that section of the Elkins law which gives authority for an injunction to restrain a railroad from charging less than its posted freight rates. The hearing for a permanent injunction is to be held on July 31. The commission's action is based on an affidavit of W. C. Bullitt, a Philadelphia coal dealer. The Chesapeake & Ohio made a contract five years ago to deliver at New Haven 2,000,000 tons of New River coal at the rate of 400,000 tons a year, for $2.75 a ton. When the contract expired in April last, 60,000 tons remained undelivered and a new contract was made for the delivery of that amount at the old rate. After paying for the coal, its transportation from Newport News to New Haven by sea and for discharging it from the vessel, there remained for the railroad company only 28 cents a ton as freight from the Kanawha district of West Virginia to Newport News, whereas the published rate for that haul is $1.45 a ton. It is this apparent discrimination of $1.17 per ton in favor of the New Haven shipments that forms the basis of the complaint. The coal was for the New York, New Haven & Hartford Railroad.

Pintsch Gas Broilers.

The original Pintsch broiler had but three broiling compartments, but recently some larger broilers with five compartments have been made by the Safety Car Heating & Lighting Co. Lately the members of the press of Missouri, at the invitation of the St. Louis Southwestern, made an excursion over the Cotton Belt Route, and on the trip all the meals were served from the five compartment Pintsch broiler. It is interesting to see what it is possible to do in the way of making up attractive menus on trains where this broiler is in use.

The First Standard Gage Chinese Locomotive.

The well-known "Rocket of China," the first standard gage locomotive ever built or run in China, is being prepared for shipment to America, at the shops of the Imperial Chinese Railway. The locomotive will be exhibited in the Baltimore & Ohio exhibit at the St. Louis Exposition. Although certain parts were lost during the Boxer outbreak, nearly all of the metal work is as first put in the machine. It was rumored that the locomotive had been taken away by the Russians, but this is untrue as it was given back to the Chinese government when the line outside the Great Wall was returned, last October.

Rolling Stock of Russian Railroads.

In a recent report to the U. S. Government, Consul-General Guenther, of Frankfort, quotes statistics printed by the St. Petersburg *Gazette*, stating that the number of passenger cars of all the public railroads of Russia (Finland excepted) on Jan. 1, 1903, was 15,545, valued at $50,707,858, of which the Government railroads of European Russia owned 9,733; the private trunk lines, 3,858; the Asiatic Government lines, 1,541; and the private local roads, 413. The total number of mail cars was 521 and of baggage cars 1,582, with a carrying capacity of 17,311 tons. The total number of freight cars of the whole Russian system was 315,046, with a total carrying capacity of 4,190,751 tons. The total value of these is estimated at $208,072,655.

Master Mechanics' Scholarships.

The new scholarship of the Master Mechanics' Association provided by Messrs. Joseph T. Ryerson & Son, Chicago, noted in our issue of July 3d, left the selection of the school to the candidate or to the association, as the latter deemed advisable. In view of the shortness of the time before the opening of the schools, and to avoid any confusion or misunderstanding, the Executive Committee decided to make the selection, and has named Purdue University, La Fayette, Ind.

The conditions for candidates to observe are similar to those governing the Stevens Institute scholarship. Upon satisfactory evidence of eligibility, candidates will be given certificates by the secretary of the association for presentation to the university authorities, entitling them to attendance upon the entrance examinations. The candidate passing the highest examination will be entitled to the scholarship.

The Stevens Institute scholarship for this year is still to be awarded, and Secretary Taylor will send out a circular stating that applications will be received for the fall examinations.

"Privilege Tickets" for Access to Stations.

Consul Joseph I. Brittain reports to the Government from Kehl, Baden, that on July 18, the Baden Department of Railways issued an order restricting the free passage of the public through the depots and upon the platforms where the trains enter and depart, in order to prevent accidents and the congregating of the public where the employees might be interfered with in the discharge of their duties. In the future all persons will be obliged before passing through the gates to show either a railroad ticket or a ticket giving them the privilege of the platforms. These "privilege" tickets cost about 2½ cents and may be procured by dropping a 10-pfennig piece into an automatic machine. As the enforcement of the new order on all the lines at once would involve considerable expense and necessitate changes at many of the stations, it will be enforced gradually.

Fast Time on the Burlington.

Chicago, Burlington & Quincy mail train No. 8 recently made the run from Burlington, Iowa, to Chicago, 205.6 miles, in 202 minutes net running time, or at the rate of 61.1 miles an hour. The train was received late from the west and left Burlington late. There were five cars in the train, and the engine was No. 1,590, a Columbia type of the following dimensions:

Cylinders	19 in. x 26 in.
Diameter of drivers	84¼ in.
Weight on drivers	86,200 lbs.
Total weight	138,000 lbs.
Grate area	44½ sq. ft.
Heating surface, total	1,581 sq. ft.
Heating surface in fire-box	151 sq. ft.
Heating surface in combustion chamber	37 sq. ft.

Burlington is about 50 ft. lower than Chicago, and the first 40 miles of the run is mostly up-grade, with numerous grades of 21 to 26 ft. per mile. Only two stops were made: one of 5 minutes at Galesburg, and one of six minutes at Mendota, both for water and oil. The 79.7 miles between Galesburg and Mendota were covered in 75 minutes, or at 63.8 m.p.h.; Mendota to Aurora, 45.4 miles, was made in 40 minutes, or 68.1 m.p.h.; Aurora to Clyde, 28.9 miles, in 26 minutes, or 66.6 m.p.h.

Where Unions Do Not Benefit Their Members.

Mr. George J. Bancroft writes to the *Engineering and Mining Journal* of conditions in Arizona and Sonora as follows: The price of labor is governed entirely by the law of supply and demand, and I don't believe that the price can be kept on an artificial plane by a labor "trust." So far as I know every "trust" that has tried to maintain excessive prices on its commodity has gone to the wall. The best illustration of the fact, that the labor unions have had very little to do with the betterment of laborers' conditions, is afforded by the relative conditions on each side of the Sonora-Arizona line. Before the railroad was built to Guaymas, say, in 1875, the Mexican miners were paid about 25 cents per day. They now get from $1.50 to $2, or seven times as much, on the average, as they used to get. On the Arizona side of the line there has been no material change. The miners used to get $4 a day, and put in a good, fair shift of 10 or 11 hours. Now the union labor wages are from $3 to $3.50, but the working hours are shorter. It is true that the Mexicans are paid in silver and the Americans in gold, but inasmuch as all the necessaries of life, to the Mexican, are produced in Mexico, a silver dollar is just as valuable to him as a gold dollar is to the American, living on this side of the line. Had the unions done as well, no better, for their union men, as non-unionism has done for the Mexicans, the Arizona miners would be getting seven times $4, or $28, per day. Instead of helping our American workman they have helped the Mexican, for the American capital that was ready and willing to develop American mines and employ American labor has been driven from the home field by the unions, and has been forced to shed its blessings on a foreign land.

Shipping News.

It is said that the British Government has completed an agreement with the Cunard Steamship Company in accordance with which the Government will pay over $5,000,000 for the building of two large express steamers, the whole fleet to be at the Government's disposal as cruisers.

Judge Andrew Kirkpatrick, of the United States District Court at Newark, N. J., has signed an order on behalf of the Mercantile Trust Company, of New York, permitting that company to foreclose a $16,000,000 mortgage of the United States Shipbuilding Co., held by it as Trustee for bondholders.

W. W. Canada, United States Consul at Vera Cruz, Mexico, reports to the Government that the Hamburg-American Packet Company has inaugurated a special fast freight and passenger steamship service between Hamburg and Vera Cruz by way of Havre, Coruna, Havana and Tampico. The vessels range in tonnage from 5,600 to 6,030 tons, are thoroughly modern in power and equipment and have an average speed of about 14 knots. They have been specially fitted with a view to the comfort of passengers in the tropical service. There are at present

three vessels in the fleet and the largest will draw 24 ft. when fully loaded. The service is to be monthly.

Advance sheets of statistics which will be incorporated in the new edition of Lloyd's Register give the total shipping of the world as consisting of 29,943 steamships and sailing vessels, aggregating 33,643,131 tons. Of this fleet 17,761 vessels, with an aggregate tonnage of 27,183,365, are propelled by steam, and 12,182 vessels, with an aggregate tonnage of 6,459,766, are propelled by sail. These figures show an increase over last year of 315 vessels and of 204,368 tons, but this advance is entirely in vessels propelled by steam. There were fewer sailing vessels built in 1902 than in any previous period in the history of the industry. The following table shows the registry of steamers of over 5,000 tons.

	Over 5,000 tons.	Over 7,000 tons.	Over 10,000 tons.
British	336	119	48
German	59	15	26
American	34	7	7
French	30	4	2
Dutch	6	4	2
Russian	10	2	..
Austro-Hungarian	4	1	..
Japanese	16	..	..
Spanish	7	..	..
Danish	..	1	2

According to the *Journal of Commerce and Commercial Bulletin* more immigrants arrived in the United States during the fiscal year that ended June 30 than in any other year in the history of the country. The total arrival for the 12 months was 857,046, being 68,054 above the previous record year of 1882, when restrictive legislation was pending in Congress. As regards nationalities, Italians held the record for the entire year, with a total of 230,632 immigrants, an increase over the previous year of 52,247. Austria-Hungary is second in the year's record, with a total of 206,011, an increase of 34,022, and the Russian Empire and Finland is third with a total of 136,093, an increase of 28,748. It is pointed out that it all the Italians alone who arrived in the United States last year were gathered together in one city it would contain almost identically the combined population of Louisville, Ky., and Council Bluffs, Iowa. In addition to this the increase from Austria-Hungary would constitute a city as large as Jersey City, N. J., and the Russian immigrants would make a city slightly larger than Denver, Colo. Of the total arrival of immigrants 631,885 entered through the port of New York. Boston came second with a very much smaller number—62,883—and Baltimore third with 55,802. Honolulu reports 14,550 immigrants, of which a large proportion were Japanese, furnishing evidence in support of Commission of Labor Wright's prediction that if present conditions in the Hawaiian Islands continued for a few years longer the islands will become Japanese.

PERSONAL.

—Mr. George F. Baer, President of the Philadelphia & Reading, accompanied by his family, will leave for Europe on Thursday, July 23, to be gone about two months.

—Messrs. Otto Blum and Erich Giese, of Berlin, engineers of the Royal Prussian Railroad and instructors in the Berlin Technical Academy, arrived at New York, July 14. They were sent by the Minister of Public Works to study American methods in railroad engineering, and will spend about three months here.

—Col. J. F. Steele, one of the best known civil engineers in Alabama and a prominent citizen of Florence, died in that city July 13, at the age of 77. Col. Steele was a graduate of the University of Alabama and also a graduate in law of the University of Virginia. He was engaged in the original survey of important parts of two of the principal railroads of his State, the Louisville & Nashville and the Southern.

—Mr. Willis D. Hager, formerly Purchasing Agent of the Delaware, Lackawanna & Western, was killed by a train at East Orange, N. J., July 15. He was about to take a train for New York. He stepped across the track to be ready for his train and in doing so walked directly in front of an express train. Mr. Hager was born in Schoharie County, N. Y., in 1844, and entered the service of the Lackawanna in 1865.

—Mr. Frederick Winn Bond, Chief Engineer of the Fort Smith & Western, whose death occurred at Fort Smith, Ark., July 12, was about 51 years old. Mr. Bond entered the service of the St. Louis & San Francisco as Resident Engineer in 1880. In 1896 he became Chief Engineer of the Fort Smith & Western. From 1891 to 1896 he was Chief Engineer for the Kansas & Texas Coal Company, and took a prominent part in the development of the railroads of that company.

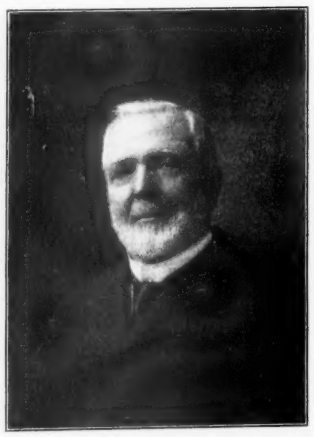
—Mr. N. E. Smith, Superintendent of Telegraph of the New York, New Haven & Hartford, was born in Southbridge, Mass., in 1855. This position is a newly created one, this road never before having had a Superintendent of Telegraph. Mr. Smith began his railroad service in 1879 as night operator at Franklin, Mass., for the New York & New England, but was shortly transferred to the train despatcher's office at Boston. In 1882 he resigned to go to the New Haven road at New Haven. He was later made chief despatcher, which position he held up to the time of his appointment as Superintendent of Telegraph.

—Mr. G. A. Heller, who has succeeded Mr. Pindell as Superintendent of the Erie Railroad at Elmira, N. Y., has been for some time past Trainmaster at that point. His early experience was on the Utica, Ithaca & Elmira, now a branch of the Lehigh Valley. In 1878 he resigned to go to the Lehigh Valley as an operator at Van Etten, N. Y., where he remained until 1880. In that year he went to the Erie as telegraph operator at Elmira, and has since been located in that city, except for about two years, when he was stationed at Susquehanna. From operator he became train despatcher, then chief despatcher, and from 1899 was Trainmaster, which position he held until his new appointment as above.

—Mr. R. H. L'Hommedieu, whose promotion to be General Manager of the Michigan Central was announced last week, is 53 years old. He was born in Cincinnati, Ohio, and began his railroad work in the machine shops of the Cincinnati, Hamilton & Dayton. Then for a time he was on the Chicago, Burlington & Quincy, and for several years was yard clerk on the Michigan Central. He has been connected with this company for the past 26 years, and was for many years Trainmaster. He passed through various positions until he became Division Superintendent at Chicago. From Chicago Mr. L'Hommedieu became Assistant General Superintendent and later was made General Superintendent, which latter position he now resigns to become General Manager.

—Mr. Joseph W. Maxwell, the new Assistant General Manager of the Missouri, Kansas & Texas proper, was for a number of years General Superintendent of the Missouri, Kansas & Texas Railway of Texas. Mr. Maxwell was born in Urichsville, Ohio, in 1851, and has been in railroad service since 1866, beginning on the Pittsburgh, Cincinnati & St. Louis as telegraph operator. In December, 1870, he resigned to go to the Missouri Pacific as train despatcher. In 1871 he was appointed to a similar position on the Missouri, Kansas & Texas, but soon resigned to go to the St. Louis, Iron Mountain & Southern. From this company he went to the Wabash, and then to the St. Louis, Arkansas & Texas. In 1885 he went back to the Missouri, Kansas & Texas as Trainmaster. For the next five years he was Division Superintendent, then for three years Superintendent of the Missouri, Kansas & Texas of Texas, and since 1895 General Superintendent.

—Mr. Peter M. Arthur, Chief of the Brotherhood of Locomotive Engineers, died suddenly, dramatically, at Winnipeg, Man., July 16. Mr. Arthur was attending a dinner given by the Brotherhood and he had begun a speech in response to a toast when stricken with heart failure. He was a native of Scotland and was about 72 years old. When very young he came to this country and began work in the shops of the New York & Harlem. Later he was an engineer on the New York Central & Hudson River. His name was Peter McArthur, but it was written P. M. Arthur on the payroll and he never corrected the mistake. In 1863, when the Brotherhood of Locomotive Engineers was organized, Mr. Arthur did much to advance its interests, and in 1873 became the Grand Chief. He has been regularly re-elected every three years since though sometimes against strong opposition from the radical element in the brotherhood. Mr. Arthur first came into prominence in 1877 as a strike manager, but he learned his lesson thoroughly, and thereafter his influence was always for negotiations and conciliation. On many occasions he kept the engineers from sympathetic strikes. A notable instance of this occurred during the extensive railroad strikes under the direction of Debs, in 1894. On the other hand he was regarded by railroad officers as a man of sagacity and fair dealing. There can be no doubt that the engineers' organization owed increased wages and prolonged periods of steady employment to his discreet and patient policy.



There were three noticeable points in his character. He had a judicial mind and knew whether the points in his case were good or not; he was a canny Scot, and therefore a good bargainer when it came to making a settlement; and he early discovered the need that a labor leader must act on the assumption that he is guilty until proved innocent. That is, he never laid himself open to the charge of taking money in settlement of labor troubles, because he never would interview the officers of the railroad unless a committee of his men was present. One of the things he did was to enforce temperance among locomotive engineers, and he compelled the Brotherhood to expel drinking men, knowing as he did, the attitude of railroads on this question. Perhaps the one blot in his career was the management of the great Chicago, Burlington & Quincy strike in 1888. He opposed this strike just as he tried to prevent all strikes, but when it occurred he did not attempt to prevent the reign of assassination and mob law which followed.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—W. B. Storey, Jr., Chief Engineer, has been temporarily assigned to duties in connection with the new line being built in California. C. A. Morse has been appointed Acting Chief Engineer during the time Mr. Storey is away, probably about six months, and J. M. Meade, Resident Engineer at Topeka, will assume Mr. Morse's former duties as Engineer in charge of Maintenance of the Eastern Grand Division.

Boston & Maine.—Frank Barr, heretofore Assistant General Manager, has been elected Third Vice-President and General Manager, with headquarters at Boston. C. E. Lee has been appointed to succeed Mr. Barr, and Mr. Lee in turn will be succeeded as Superintendent of the Worcester, Nashua & Portland Division, with office at Nashua, by W. R. Mooney, Superintendent at Concord, N. H.

Brunswick & Birmingham.—G. W. Berry has been appointed General Manager and J. A. McDuffie is Traffic Manager.

Chicago, Rock Island & Pacific.—The jurisdiction of W. J. Leahy, Assistant General Passenger Agent, has been extended to lines west of the Missouri River.

The announcement made in our issue of July 10, that H. Gower, Assistant Freight Traffic Manager, had resigned, is incorrect.

Chicago & Alton.—A. L. Humphrey, Superintendent of Motive Power, with headquarters at Bloomington, Ill., has resigned, effective Aug. 1. It is understood that Mr. Humphrey will enter the service of the Westinghouse Air-Brake Company, at Pittsburg.

Chicago, Cincinnati & Louisville.—A. L. Moler, heretofore Master Mechanic of the Vicksburg, Shreveport & Pacific, has been appointed Superintendent of Motive Power of the C., C. & L., effective Aug. 1.

H. K. Mudd, Master Mechanic, with office at Richmond, Ind., has resigned.

F. E. Signer, General Freight and Passenger Agent, with office at Richmond, Ind., has resigned. (See Lehigh-Wabash Despatch.)

Denver & Rio Grande.—R. H. Bowron has been appointed Superintendent of the First Division, with office at Pueblo, Colo., succeeding D. Hardy, resigned.

Erie.—The following changes have been made in the auditing department: M. P. Blauvelt, hitherto Auditor, has been appointed General Auditor; D. W. Bigoney, hitherto Assistant Auditor, has been appointed Assistant General Auditor; C. P. Crawford, Auditor of Disbursements, becomes Auditor of the Erie Coal companies, and J. R. Livengood becomes Auditor of Disbursements.

G. A. Heller has been appointed Superintendent of the Susquehanna and Tioga Divisions, with headquarters at Elmira, N. Y., succeeeding T. H. Pindell, resigned.

See Lehigh Valley.

Gulf & Interstate.—J. H. Johnston has been appointed Traffic Manager, with headquarters at Galveston, Texas.

Illinois Central.—R. W. Goelet has been elected a Director, succeeding the late B. F. Ayer.

Lehigh Valley.—J. W. Platten, hitherto Treasurer of the Erie, has been appointed Assistant to the President of the L. V., with office at Philadelphia. Mr. Platten will have charge of the financial, accounting and purchasing departments of the company.

Lehigh-Wabash Despatch.—F. E. Signer, heretofore General Freight and Passenger Agent of the Chicago, Cincinnati & Louisville, has been appointed Manager, with office at Detroit.

Minneapolis & St. Louis.—C. P. Eastman has been appointed Assistant General Freight Agent, with office at Minneapolis, Minn., succeeding J. L. Blake, resigned. (See Newton & Northwestern.)

National of Mexico.—F. W. Baldwin has been appointed Superintendent, with headquarters at Acambaro, Mex., succeeding W. A. Moore, resigned.

Newton & Northwestern.—J. L. Blake, heretofore Assistant General Freight Agent of the Minneapolis & St. Louis, has been appointed General Manager of the N. & N. W., with headquarters at Boone, Iowa, effective July 20.

Oregon Short Line.—J. A. Weed has been appointed Superintendent of Bridges and Buildings, succeeding J. M. Bennett, resigned. A. H. King succeeds Mr. Weed as Superintendent of Bridges and Buildings of the Montana Division. Both will have headquarters at Pocatello, Idaho.

Pennsylvania.—D. M. Perine, Master Mechanic at Pittsburg, has been transferred to Philadelphia. I. B. Thomas, hitherto Assistant Engineer of Motive Power, with office at Altoona, has been appointed to succeed Mr. Perine at Pittsburg.

Queen & Crescent.—A. L. Moler, Master Mechanic of the Vicksburg, Shreveport & Pacific, with office at Monroe, La., has resigned. (See Chicago, Cincinnati & Louisville.)

St. Paul Union Depot.—J. Strawhorn has been appointed Superintendent, with headquarters at St. Paul, Minn., succeeding W. F. McMillan.

San Francisco & Northwestern.—This company having purchased the property of the Eel River & Eureka and of the California Midland, and also the railroad of the Pacific Lumber Company, the operation of the lines of railroad so acquired formally began in this company's name on the first of this month. The officers of this company are: A. H. Payson, President; Horace Pillsbury, Vice-President; F. W. Zeile, Treasurer; A. Moreton, Secretary, all of San Francisco; B. F. Porter, Second Vice-President, General Manager and Assistant Treasurer, Eureka, Cal.; T. R. Lever, Assistant Secretary and Auditor, Eureka, and W. B. Storey, Jr., Chief Engineer in entire charge of Surveys and Construction, with office at San Francisco; T. R. Lever, Acting General Freight and Passenger Agent; C. L. Rose, Superintendent of Track, Bridges and Buildings, and H. Whitman, Master Mechanic.

Wabash.—H. G. Clark, Superintendent of the Missouri Pacific at Atchison, has been appointed Superintendent of the Middle Division of the Wabash, with headquarters at Decatur, Ill., succeeding A. Robertson, resigned. (See Western Maryland.)

Western Maryland.—A. Robertson, hitherto Superintendent of the Middle Division of the Wabash at Decatur,

Ill., has been appointed Manager of the W. M. and the West Virginia Central & Pittsburgh. These two roads are now controlled in the Wabash interest.

West Virginia Central & Pittsburgh.—See Western Maryland.

LOCOMOTIVE BUILDING.

The New Orleans & Northeastern is having one locomotive built at the Baldwin Works.

The New York Central is having seven locomotives built at the Schenectady Works of the American Locomotive Co.

The American-China Development Co. is having two locomotives built at the Pittsburg Works of the American Locomotive Co.

F. M. Hicks, of the Hicks Locomotive & Car Works, has received orders for the following equipment: Midland Valley R. R., two 10-wheel (4-6-0) locomotives; Louisville & Atlantic, one freight locomotive; Arkansas Lumber Co., one logging engine.

The Southern has filed an equipment mortgage for 147 locomotives. Of this number, the American Locomotive Co. will build 57 simple consolidation (2-8-0) locomotives for delivery ranging from October, 1903, to June, 1904, and the Baldwin Locomotive Works will build 36 consolidation (2-8-0) locomotives, 29 10-wheel (4-6-0) locomotives, five Pacific (4-6-2) locomotives, and 20 (0-6-0) switching engines.

The Minnesota & International, as reported in our issue of July 17, is having three locomotives built at the Richmond Works of the American Locomotive Co., for August, 1903, delivery. These locomotives will weigh 127,000 lbs., with 107,000 lbs. on drivers; diameter of drivers, 60 in.; cylinders, 19 in. x 24 in.; extended wagon top boiler, with a working steam pressure of 200 lbs. Special equipment includes Railway Steel Spring Co.'s springs, Hancock injectors, Tower couplers, Westinghouse brakes, consolidated safety valves, Leach sanding devices, Michigan lubricators, Ashcroft steam gages, and Midvale tires.

The Louisville & Nashville, as reported in our issue of July 3, is having 55 simple consolidation (2-8-0) locomotives built at the Baldwin Works for September, 1903, delivery. These locomotives will weigh 174,000 lbs., with 156,000 lbs. on drivers; cylinders, 21 in. x 28 in.; extended wagon top radial stay boilers, with a working steam pressure of 190 lbs.; 320 tubes, 2 in. in diameter, and 14 ft. long; fire-box, 120 in. long and 40 in. wide; tank capacity, 5,000 gallons of water and 10 tons of coal. Special equipment includes Westinghouse brakes, Sterlingworth tender brake-beams, U. S. metallic packing, Crosby steam gages and whistles, Nathan sight-feed lubricators, Coale safety valves, and Leach sanding devices.

The Detroit & Mackinac, as reported in our issue of July 3, is having two simple consolidation (2-8-0) locomotives built at the Schenectady Works of the American Locomotive Co. These locomotives will weigh 168,000 lbs., with 151,000 lbs. on drivers; cylinders, 21 in. x 26 in.; straight boiler, with a working steam pressure of 200 lbs.; 376 tubes, 2 in. in diameter and 13 ft. long; fire-box, 120 5/16 in. long and 41 in. wide; tank capacity, 6,000 gallons of water, and coal capacity 11 tons. Special equipment includes sectional magnesia boiler lagging, Richardson balance valves, Sellers injectors, Tower couplers, Westinghouse-American brakes, consolidated safety valves, cast-steel driving wheel centers, Adams-Westlake headlights and Crosby steam gages.

CAR BUILDING.

The Pullman Co. is building 16 coaches at Buffalo for general service.

The Atchison, Topeka & Santa Fe has ordered 200 flat cars from the American Car & Foundry Co.

The Arizona & New Mexico has ordered one narrow gage coach from the American Car & Foundry Co.

The Mexican Ry. has ordered 30 ballast cars and 20 "pulque" cars from the American Car & Foundry Co.

The American Car & Foundry Co. has miscellaneous orders for six logging cars, 10 ballast cars and 16 car bodies.

The Mobile, Jackson & Kansas City is about to build 100 40-ft. flat cars of 80,000 lbs. capacity at its own shops at Mobile, Ala.

The Southern has filed an equipment mortgage to cover 500 box cars and 200 drop bottom gondolas, ordered from the Mt. Vernon Car Mfg. Co.

The St. Louis Southwestern has ordered five baggage cars, five mail and baggage cars, 10 chair cars and 15 coaches from the American Car & Foundry Co.

The International & Great Northern is having 100 freights built at the St. Louis Works of the American Car & Foundry Co. This order was reported as placed in our issue of July 17.

The Chicago, Indianapolis & Louisville, as reported in our issue of July 17, has ordered 200 40-ft. gondolas of 80,000 lbs. capacity from Haskell & Barker. Special equipment includes Harrison dust guards, Westinghouse brakes and Trojan couplers.

The Missouri, Kansas & Texas has ordered 13 chair cars, one postal car, 21 coaches, 10 baggage cars, five combination coach and baggage cars, seven combination mail and baggage cars and six combination coach and mail cars from the American Car & Foundry Co. The specifications for the coaches and chair cars were given in our issue of June 5.

The Jacksonville & Southwestern, as reported in our issue of July 17, has ordered 40 flat cars of 60,000 lbs. capacity, from the Georgia Car & Mfg. Co., Savannah, Ga., for August, 1903, delivery. These cars will weigh 27,000 lbs. and will be 36 ft. 10 in. long and 9 ft. 2 in. wide over sills. Special equipment includes steel axles, Keystone bolsters, Sterlingworth brake-beams, cast-iron brake-shoes, Westinghouse brakes, Harrison dust guards, Tower couplers, Miner tandem draft rigging, McCord journal boxes, Sherwin-Williams mineral brown paint, Pittsburg Spring & Steel Co.'s springs and diamond trucks.

F. M. Hicks, of the Hicks Locomotive & Car Works, has received orders to build the following equipment: Midland Valley, 25 flat and 12 box cars; Orange & Northwestern, 40 flat cars; Toledo, Port Clinton & Lakeside, five flat cars; Santa Fe Central, seven tank cars; Denver, Enid & Gulf, 15 box cars; Interurban Ry. of Des Moines, eight flat cars. Miscellaneous orders for freight cars have also been received from the Trexler & Turrell Lumber Co., Oscar Daniels Co., Western Wheel Scraper Co., Crossett Lumber Co., Ohio River & Columbia Ry. Co., L. H. Vaughan & Co., Thomas Phee, Laquin Lumber Co., and the Cleveland, Painesville & Ashtabula R. R.

BRIDGE BUILDING.

ALLENTOWN, PA.—Attorney General Carson has filed exception to the second report of the viewers recommending the building by the State, of a new steel bridge here, costing $125,000.

BLACKSTONE, MASS.—It is reported that bids for the Millville bridge have been rejected. New ones may be asked.

CEDAR FALLS, IOWA.—New bids may be asked for three steel bridges, the Board of Supervisors having rejected those submitted.

CHICAGO, ILL.—An officer of the Illinois Central writes in regard to the report that the company intends to replace all wooden bridges between Memphis and Louisville with steel structures, that the only work contemplated is the re-construction of the Tennessee River bridge and one or two minor structures, parts of which are new combination spans. The work is included in a contract already let to the American Bridge Co.

The Chicago Bridge & Iron Co. has received a contract to build the superstructure of four steel highway bridges over the Illinois & Mississippi Canal, for the Government at $17,816.

CHESTER, S. C.—Reports state a 200-ft. bridge will be built across Seeley's Creek on the Union Ferry Road.

CLARKSBURG, KAN.—Bids are wanted Aug. 5, by Lydia Barton, County Clerk, for an iron bridge over Moors Branch.

DAYTON, OHIO.—Plans are being prepared for a concrete steel bridge at Third street, but bids will not be asked for several months. F. M. Turner, City Engineer.

DERBY, CONN.—Bids are wanted Aug. 4, at the office of the Corporation Counsel, for a steel bridge 250 ft. long over the Naugatuck River, bids to be on either steel, concrete or concrete-steel. E. D. Graves, Consulting Engineer, Hartford, Conn.

DES MOINES, IOWA.—New bids may be wanted for the East Sixth street bridge, as the contractor has concluded not to do the work for the price of his contract.

Bids may soon be wanted for a bridge across the river at the foot of State street.

DUBUQUE, IOWA.—It is reported that bridges have been washed away in Venron, Dodge, Washington, Cascade and Iowa townships.

ELYRIA, OHIO.—Bids may soon be wanted for the Washington avenue bridge. The ordinance calls for a double arch bridge of 35 ft. roadway and 6 ft. walks, at about $25,000.

No legislative action has yet been taken towards building the Mussey avenue bridge.

FORT MEAD, FLA.—It has been decided to build a steel bridge across Peace River here.

GALT, ONT.—A bridge over the Grand River on Main street is being considered.

GUTHRIE, KY.—It is reported that two bridges will be built over West Fork and Red rivers for the Louisville & Nashville.

HAMILTON, ONT.—The Grand Trunk Ry. proposes to build a new bridge near Dundas, in connection with the double track work between Hamilton and Brantford.

LAWRENCE, MASS.—It is reported that bids will soon be asked for a bridge at South Union street. Surveys are being made by the Boston & Maine.

LEAVENWORTH, KAN.—Reports state that the Legislature has authorized the rebuilding of three bridges at about $60,000.

MEADVILLE, MISS.—The Franklin County Board will take up the question at the September meeting, and will probably decide to build four steel bridges. C. A. Pritchard, Chancery Clerk, so reports to us.

MONTREAL, QUE.—The application to the Dominion Parliament for the incorporation of the Montreal Bridge Company, which proposes to bridge the St. Lawrence, has been withdrawn and the project is looked upon as having been definitely abandoned.

Another company, as previously reported, proposes to bridge the St. Lawrence between Montreal and Longueuil, but its plans are being objected to by the Railway Committee and may not be approved.

NEWNAN, GA.—Bids are wanted Aug. 5, for a 72-ft. steel bridge at Coles crossing. W. L. Stallings, Clerk.

NEWTON, MASS.—City Engineer Irving Farnham tells us that in the abolition of grade crossings on the south side of the city of Newton, there will be eight highway bridges over the railroad, and one railroad bridge over a highway. No decree for this work has yet been issued. When the work is authorized, the letting of the contracts for bridges will be in the hands of the Boston & Albany.

OBERLIN, KAN.—Bids are wanted Aug. 5, by J. E. Plotts, County Clerk, for four steel bridges of 168 ft. aggregate length.

PATERSON, N. J.—A $10,000 bridge may be built over the Susquehanna Railroad tracks on Summer street.

PEKIN, ILL.—Bids will be received Aug. 12, by City Clerk Charles J. Skaggs, for four spans or a complete superstructure for a highway bridge over the Illinois River at this place.

PEMBROKE, ONT.—Bids are asked for the building of stone abutments for the new steel bridge over Indian River.

PHILADELPHIA, PA.—Local reports state that the Pennsylvania R. R. will soon ask bids for a stone arch bridge over the Schuylkill River at Fairmount Park, to replace the present steel structure. The new bridge will have four tracks and will be nearly 900 ft. long.

PORTLAND, ORE.—Thomas C. Devlin, Auditor, tells us that plans and specifications are now completed for the bridge at First street.

RAT PORTAGE, ONT.—Plans have been prepared for a steel bridge, with concrete abutments, over the Winnipeg River.

READING, PA.—Separate bids are wanted July 30, by the City Clerk, for repairs to present structure, or a new bridge of same design as present structure or a new bridge of improved concrete-steel, on Fifth street crossing of the Lebanon Valley branch of the Philadelphia & Reading.

ST. JOHN, N. B.—A bridge across the harbor is planned by the Council.

ST. JOHNS, QUE.—The Montreal & Southern Counties Electric Ry. proposes to bridge the Richelieu between St. Johns and Iberville. A. J. DeB. Corriveau, Montreal, is Vice-President and General Manager. The Central Vermont Ry. is also interested in the proposed bridge.

ST. PAUL, MINN.—It is reported that the Board of Aldermen have approved the plans submitted by the Chicago, Milwaukee & St. Paul R. R., for a bridge to be built at St. Clair street at about $15,000.

TRIADELPHIA, MD.—Specifications for a double truss bridge over the Patuxent River here have been prepared by Howard County Commissioners.

UTICA, MO.—Bids are wanted Aug. 4, for a 192-ft. bridge to be built over Grand River for Livingstone County. Address J. J. Powell, Chillicothe, Mo.

WASHINGTON, D. C.—An officer of the Pennsylvania says that the plans of the South Capitol street bridge are ready for bidders, but will not be made public until approved by the District Commissioner.

WAUSEON, OHIO.—Bids are wanted July 30, by the County Commissioner, for a bridge over Beaver Creek on the Angola road.

WEBSTER, PA.—Viewers have been appointed to pass upon a site for the bridge authorized by Congress over the Monongahela River, between this place and Donora.

WILKESBARRE, PA.—The Council has been petitioned for $20,000 to build a bridge over the railroad tracks from Butler to Pearl streets, connecting East End and North Wilkesbarre. The remaining cost of $80,000 is to be borne by the railroads interested.

WILMINGTON, DEL.—Bids are wanted July 28, by the Comptroller of New Castle County, for a concrete bridge across Beaver Run at Wilson's Mill, Brandywine hundred.

WOODWARD, OKLA. T.—Bids are wanted Aug. 8, by C. C. Hoag, County Clerk, for a bridge over the North Canadian River and Wolf Creek.

Other Structures.

MONTREAL, QUE.—The Wire & Cable Co., St. James street, Montreal, will erect new buildings, thereby doubling its capacity.

NEW ORLEANS, LA.—It is reported that the Illinois Central will build a shed, wharf and freight house here, costing about $130,000.

OLEAN, N. Y.—The plans for the shops of the Pennsylvania at this place are not sufficiently advanced to furnish particulars.

PARSONS, KAN.—An officer of the Missouri, Kansas & Texas Ry. says that the new roundhouse of 32 stalls, with a small machine shop attached, is now building at this place. It will be of brick with gravel roof, and cost about $100,000.

PHILADELPHIA, PA.—Contracts have been given to Sparks & Evans, Armstrong & Latta and others, to build a machine and blacksmith shop at the Park shops on Viola street, for the Pennsylvania. It will be a one-story, steel frame building, 50 ft. x 150 ft., with corrugated iron sides and slag roof.

PORTSMOUTH, VA.—In regard to enlarging the Seaboard Air Line shops here, an officer says that the company is merely rebuilding those structures destroyed by fire May 22. The work is being done by the company's forces.

SALT LAKE CITY, UTAH.—Reports state that the shops for the Denver & Rio Grande here will be built at once, and the shops at Denver enlarged.

SPARTANBURG, S. C.—The Southern Railway is getting plans ready for a new station here.

WATERLOO, IOWA.—Plans are being made for an addition to the Chicago Great Western freight house here. Bids will be asked in a few weeks.

WEST SPRINGFIELD, MASS.—Press reports state that the New York Central will build a new engine house near the present shops at this place. Plans have not yet been made.

WILMINGTON, DEL.—Reports state that the shops building here for the Pennsylvania Railroad, to comprise part of its new plant, will not be large enough for the company's needs, and all the important buildings will be made much larger than the original plans intended. The plans for the proposed extensions have been completed and permits for starting the work have been issued by the city. The estimated cost of the extensions will be about $113,500.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ARKANSAS VALLEY INTERURBAN.—A charter has been granted this company in Kansas with power to build an electric road from Wichita to Arkansas City, 80 miles. R. L. Holmes, Wichita, Kan.; W. E. Wilcox, Arkansas City; A. H. Barnes, Oxford, and others are incorporators.

BIG SANDY, EAST LYNN & GUYAN.—It is reported that grading is finished on this road from Wayne, W. Va., to East Lynn coal mines, and that track laying will be begun at once. T. W. Simpson, Radford, Va., is the engineer in charge of the work. (See Construction Supplement.)

CASPAR, SOUTH FORK & EASTERN.—Articles of incorporation have been filed by this company in California. It is proposed to build from Caspar east to Willits, Mendocino County, 35 miles. The Caspar Lumber Co. is said to be interested.

CENTRAL PENNSYLVANIA TRACTION.—A charter has been granted this company by the State, with power to operate the lines of the Harrisburg Passenger Railway, and the East Harrisburg Street Railway Companies. Capital $2,100,000. Edward Bailey, Harrisburg, Pa., is President.

CHICAGO & WABASH VALLEY.—Press reports state that work has been begun on an extension of this road from Kankakee River to Cedar Lake, Ind., 13 miles. B. J. Gifford and J. E. Jones, Kankakee, Ill., are interested. (See Construction Supplement.)

CHICAGO, ROCK ISLAND & PACIFIC.—Contract has recently been closed by this company with W. F. Buren, Princeton, N. J., for a million cubic yards of crushed stone to be delivered before Jan. 1, 1904. The stone will be used for reballasting on the Iowa and Missouri divisions.

CHICKASAW & NORTHEASTERN.—A charter has been granted this company in Oklahoma, to build from Chickasaw, Ind. T., through the Chickasaw, Seminole and Creek nations south to Holdenville, Ind. T. The incorporators are all Oklahoma capitalists.

DALLAS, CLEBURNE & SOUTHWESTERN.—Press reports state that an extension will shortly be begun from Cleburne, Texas, to Glenrose, 25 miles. The road is now in operation from Egan to Cleburne, 10 miles, and is projected to Dallas and San Antonio.

DAYTON, LEBANON & CINCINNATI.—An officer writes that grading is now in progress on an extension of this road from Hempstead, Ohio, to Dayton, 6½ miles. It is proposed to build a branch line from Lebanon to Cincinnati, 26 miles. The Great Northern Construction Co., of Columbus, Ohio, has the contract for building the extension from Hempstead.

DULUTH, VIRGINIA & RAINY LAKE.—Work is reported finished on the extension of this road from a point a few miles north of Virginia, Minn., in a northerly direction for a distance of five miles. Work is now in progress on an extension from Virginia to Koochiching, Minn., 100 miles. R. A. Eva, Virginia, Minn., is General Manager. (See Construction Supplement.)

ENGLAND & CLEAR LAKE.—Grading is reported finished on this line from England, Ark., via Clear Lake to Laster's Landing, nine miles. H. Galloway, England, Ark., is the superintendent in charge of the work. (May 15, p. 352.)

GULF & INTERSTATE.—It is reported that about 12 miles of this road out of Bolivar, Texas, which was destroyed by the storm of 1901, has been rebuilt, and that the road will be entirely rebuilt before January. L. P. Featherstone, Beaumont, Texas, is interested. (See Construction Supplement.)

HALIFAX & SOUTHWESTERN.—It is reported that contract for grading 40 miles of this line between Halifax and Mahone Bay, N. S., has been let, and that work will be begun as soon as the plans have been approved by the Dominion Government. T. H. White, Bridgewater, N. S., is the engineer in charge of the work. (See Construction Supplement.)

INDIANAPOLIS & SHELBYVILLE ELECTRIC.—Surveys are reported finished for the proposed extension of this line from Shelbyville, Ind., southeast to Greensburg, 20 miles. The proposed route will parallel the Cleveland, Cincinnati, Chicago & St. Louis between these two points. It is stated that bids for grading will shortly be asked.

INDIANAPOLIS, LOGANSPORT & CHICAGO.—This company has been incorporated in Indiana, to build from Indianapolis via Logansport to Chicago. It is stated that the contract for building the line has been let to the Crescent Construction Co., of Chicago. C. M. Haven and W. S. Carson, of Indianapolis, are interested.

LITCHFIELD & MADISON.—At a recent meeting of the directors of this company, it was voted to issue bonds to be used for improvements on the road, and for a branch from the main line to mines at Staunton, Ill. The road now runs between Litchfield, Ill., and Bridge Junction, 48 miles, and is controlled by the Chicago, Peoria & St. Louis. W. H. Gridley, Springfield, Ill., is General Manager.

LITTLE ROCK & MONROE.—The newspapers say that the contract has been let for grading the first 15 miles of this road. The proposed route is from Lapile, Ark., south to Monroe, La., 50 miles. E. A. Frost, Texarkana, Ark.; J. E. Cavanaugh, Lapile, and others are interested. (June 19, p. 449.)

LOUISIANA & ARKANSAS.—The extension of this road from Stamps, Ark., to Hope, 23 miles, has been completed. Work is now in progress on another extension from Winnfield, La., to Jena, 38 miles. (April 24, p. 304.)

LOUISVILLE & NASHVILLE.—Press reports state that the branch line from Opp, Ala., to Florala, 22 miles, has been completed.

MANITOU & PIKE'S PEAK.—An officer writes that there is no truth in the report that this line is being extended from the summit of Pike's Peak, Colo., to Victor, nine miles. The engineering difficulties would be very great and the estimated cost is approximately $750,000. (July 3, p. 502.)

MEXICAN ROADS.—An American syndicate has recently made application to the Mexican Government for a concession to build and operate a railroad from Buenos Aires, Ariz., to Point Lobos, on the Gulf of Lower California. Ex-Governor N. O. Murphy, of Arizona, is said to be interested.

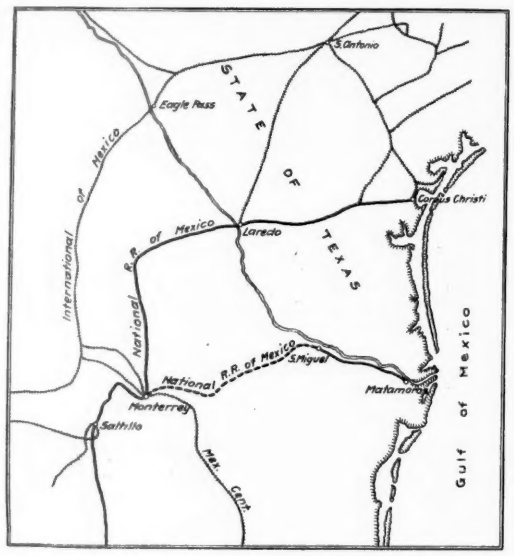
It is reported that an American syndicate has recently purchased 2,500,000 acres of timber land near the city of Chihuahua, Mexico. About 60 miles of railroad will be built from a point near the southern terminus of the Rio Grande, Sierre Madre & Pacific in a southwesterly direction.

MIDDLEBROOK, GRANITEVILLE & BELLEVIEW.—This company has been incorporated in Missouri, to build a railroad from a point near Middlebrook, Iron County, on the St. Louis, Iron Mountain & Southern, southeast to Graniteville. Jas. J. O'Toole, O. E. Rugg, of St. Louis, and others are incorporators.

MIDLAND VALLEY.—An officer writes that contract for this line from Fort Smith, Ark., southeast to Hartford, 53 miles, has been let to Ebey & Stocker, and to Maney Bros. The work is light, with maximum grade of .6 per cent., and maximum curvature of 4 deg. There will be one 200-ft. and two 100-ft. bridges. F. A. Molitor, Fort Smith, is Chief Engineer. (July 3, p. 502.)

MOBILE, JACKSON & KANSAS CITY.—Bids are now being asked by this company for grading about 140 miles south from Pontotoc, Miss., to Decatur. Location surveys have been made and rights of way secured between Newton and Ackerman. (Official.) H. S. Jones, Mobile, Ala., is the engineer in charge of the work. (July 17, p. 534.)

NATIONAL OF MEXICO.—An officer writes that contract has been let to William Scott for building the proposed extension of this road from Monterey east to San Miguel, 120 miles. Grading will be begun at once. The work is



light, with maximum curves of 5 deg., and maximum grades of 75 per cent. There will be two steel bridges. (July 3, p. 502.)

NEPIGON.—Work is to be begun at once on this road from Nepigon, Ont., to the south end of Lake Nepigon, 40 miles. Connection will be made with the Canadian Pacific at Nepigon. James Conmee, Port Arthur, is in charge of the work. (See Construction Supplement.)

NEW PALTZ, HIGHLAND & POUGHKEEPSIE TRACTION.—This company has been incorporated in New York, to build a railroad from Poughkeepsie ferry at Highland, to New Paltz, 10 miles. J. A. Duffy and T. G. Hinds, of Jersey City, are among the incorporators.

NORTHERN PACIFIC.—Surveys are reported in progress for a line from Marysville to Arlington, Wash., and thence to Everett, 14 miles.

PENNSYLVANIA.—Work has been temporarily abandoned on a portion of the new low-grade freight line now being built in Lancaster County. The section of the line which has been abandoned skirts the side of the high hills, at the foot of which runs the Columbia & Port Deposit R. R. A large amount of rock and other debris has been loosened by the heavy blasting and fallen on the tracks below, and it is for this reason that Chief Engineer Brown has decided to stop work on this section until the fall, when traffic on the Columbia & Port Deposit will not be as heavy as it is at present, and work can safely be renewed.

Contract has been let to the United States Construction Co. for excavating the shaft for the proposed Hudson River tunnel of this company at 19th street and Park avenue, Weehawken. The contract calls for the completion of the work by Dec. 8 next.

PERE MARQUETTE.—An officer writes that work is now in progress on the branch line from Harbor Beach, Mich., to Port Hope, six miles. (May 29, p. 384.)

REGINA & HUDSON BAY.—Incorporation has been granted this company by the Dominion Parliament, with power to build from a point on the International boundary, between the second and third meridians, to Regina, and thence northerly through Craven and Long Lake, in Assiniboia, to Fort Churchill, on Hudson Bay. McGiverin & Hayden, Ottawa, Ont., are said to be interested. (See Construction Supplement.)

ROGUE RIVER VALLEY.—Surveys are reported finished and rights of way secured for an extension from Medford in a northeasterly direction up Butte Creek into timber lands, 20 miles. It is stated that work will be begun in September.

SACRAMENTO SOUTHERN.—Articles of incorporation have been filed by this company in California to build from Sacramento, south to Stockton, 45 miles, with branches to Walnut Grove, Antioch and Woodbridge. The project, although paralleling the Southern Pacific, is reported to be a Southern Pacific enterprise. I. W. Hellman, Jr., J. M. Israel, J. C. Kirkpatrick and others, of Sacramento, are incorporators.

ST. ANDREW'S, QUINCY & NORTHERN.—A charter has been granted this company to build from Quincy, Fla., southwest through Gadsden, Liberty, Calhoun and Washington Counties to St. Andrew's Bay, 75 miles. J. L. McFarlin, J. W. Scott, W. H. Davidson and A. L. Wilson, of Quincy, are interested. (June 12, p. 416.)

ST. LOUIS & SAN FRANCISCO.—Contract has been awarded to the A. W. Scott Construction Co., Memphis, Tenn., for building a cut-off from Evadale, Ark., to Big Creek, 16 miles. This new line, when completed, will shorten the distance between Luxora, Ark., and Memphis by several miles. The contract calls for the completion of the work by Jan. 1, 1904. J. B. Hanna, Springfield, Mo., is the engineer in charge of the work. (June 19, p. 450.)

SAN ANTONIO & ARANSAS PASS.—Contract has been let to J. P. Nelson for grading an extension of this line from Alice, Texas, to Brownsville, 150 miles. The contract calls for the completion of work by March 1, 1904.

SAN PEDRO, LOS ANGELES & SALT LAKE.—Bids will be received by this company until July 31 for building 100 miles of this road from Caliente, Cal., southeast to a point on the Mojave River and eventually to Daggett. (June 19, p. 450.)

SIOUX CITY, HOMER & SOUTHERN (ELECTRIC).—This company has been incorporated in Nebraska, to build from Sioux City, Iowa, to Homer, Neb., 16 miles. J. H. Millard, R. S. Hall, Omaha; R. A. Talbot, Sioux City, and C. J. O'Connor, Homer, are interested.

SOUTH & WESTERN.—Work is reported in progress on the extension of this line from Spruce Pine, N. C., to Marion, 40 miles. G. L. Carter, Bristol, Tenn., is President. (See Construction Supplement.)

SOUTHERN.—An extension will shortly be built by this road from Bessemer, Ala., to Mobile Junction, 3½ miles. Magruder & Joyce, Danville, Va., are said to have received the contract for building a second track between Greensboro and Pomona, Va.

SOUTHPORT, ATLANTA & WESTERN.—This company has been incorporated in North Carolina, to build from Southport, N. C., north to Wilmington, 25 miles. C. B. Ware, W. W. Patterson, A. J. Fahnstock and others are interested. The headquarters of the company will be at Southport.

TOLUCA, MARQUETTE & NORTHERN.—Press reports state that the extension from Magnolia, Ill., to Henry, 10 miles, is practically completed. W. J. Hascheidt, Magnolia, is Chief Engineer. (See Construction Supplement.)

VALDEZ & COPPER RIVER.—Contracts for building this line from Valdez, to Eagle City, on the Yukon River, Alaska, about 400 miles, have been let to J. H. Hammond and J. H. McDonald & Co., New York. It is stated that money to build the road has been provided and that work will be finished within two years. (May 22, p. 368.)

WEST VIRGINIA CENTRAL & PITTSBURG.—The contract for building the connecting link between the West Virginia Central & Pittsburg and the Western Maryland, from Cumberland, Md., to Cherry Run, W. Va., 65 miles, has been let to Degnon & McLean, contractors, of New York. It is stated that the Knobly Mountain will be tunnelled and that seven bridges will be built over the Potomac River.

WINNIPEG, YANKTON & GULF.—An officer writes that this company, which was recently incorporated in South Dakota, will build a line from Yankton through Parker, Sioux Falls, Madison, Watertown and Brookings to Webster, all in South Dakota. H. L. Miller, Yankton, S. Dak., is President. (July 10, p. 520.)

WISCONSIN ROADS.—The Edward Hines Lumber Co. is about to build a line in Douglas County, Wis., 16 miles long, connecting its logging road with the St. Croix & Duluth, which extends from Dedham to the St. Croix River. Connection will also be made with the Great Northern at Dedham.

XICO & SAN RAFAEL.—This company has been granted an extension of time until April 6, 1908, in which to complete its line. The road at present runs between the City of Mexico and Apapasco, 70 miles, and it is being extended to the town of Atlixco, in the State of Pueblo. Manuel Contreras, Juarez, Mexico, is General Manager.

GENERAL RAILROAD NEWS.

CHICAGO, BURLINGTON & QUINCY.—This company has borrowed in New York the sum of $5,000,000 on notes to come due in March, 1904, at 5½ per cent., plus ½ per cent. commission. It is stated that the money will be used for extensive improvements.

CHICAGO, ST. LOUIS, MEMPHIS & NEW ORLEANS.—It is reported that this company, which is controlled by the St. Louis & San Francisco, is to absorb the following companies, all of which are now controlled by the St. L. & S. F.: Chicago & Eastern Illinois, 748 miles; St. Louis & Gulf, 253 miles; St. Louis, Memphis & Southeastern, 430 miles; St. Louis, San Francisco & New Orleans, 233 miles; Chicago, St. Louis, Memphis & New Orleans (to be built), 325 miles; Illinois Central (trackage rights), 100 miles, making a total of 2,089 miles. The new road will have excellent terminal facilities at the four principal points on its line, namely, Chicago, St. Louis, Memphis and New Orleans. The terminals at the two last named points have been recently purchased jointly with the Southern Railway. The line of the new company will be about 50 miles longer, from Chicago to New Orleans, than the Illinois Central main line.

EAST SHORE TERMINAL.—This company was sold on June 14, at foreclosure sale, and was bid in jointly by the Southern and the Atlantic Coast Line. The company owns about 12 miles of road and connects the water front of the city of Charleston with railroads entering the city.

ILLINOIS CENTRAL.—President Stuyvesant Fish says that the crop condition on the lines of his road are fair. The cotton crop will be late but equal in quantity to last year. Winter wheat in Southern Illinois and Kentucky is poor, but this is not an important part of the company's traffic. For the tropical fruit traffic, which is constantly growing, the Illinois Central now uses over 1,000 [ventilated] fruit cars and more than 1,600 refrigerator cars. The density of the traffic on the Illinois Central, represented last year by 1,134,968, is estimated to amount this year to 1,314,890.

LITCHFIELD & MADISON.—This company, which is controlled by the Chicago, Peoria & St. Louis, has retired $500,000 of income bonds and has made a new mortgage with the Equitable Trust Co. of Chicago, to secure $750,000 first mortgage 5 per cent. gold bonds which mature May 1, 1933. The principal and interest of these bonds is guaranteed by the Chicago, Peoria & St. Louis. For the proposed construction work on this road, see Railroad Construction columns.

LOS ANGELES TRACTION.—H. E. Huntington has purchased control of this company from Senator Wm. A. Clark. The possession of this road carries with it the ownership of the California Pacific, and places in the hands of Mr. Huntington the control of all the electric railroads entering Los Angeles.

MEXICAN CENTRAL.—It is reported that an agreement has been reached between the Mexican Central and the National of Mexico, whereby the former may lease rights over the latter's tracks along the Rio Grande and thus gain an entrance into Laredo, Texas.

NORTHERN SECURITIES.—The gross earnings of the three roads which compose this company were, for the fiscal year, approximately $151,385,000. This does not include the outside earnings of the Great Northern, which add about $3,000,000 to the total. Mr. J. J. Hill says that the Great Northern, without taking account of its outside earnings, had an increase in gross earnings for the year of $4,715,000; the Northern Pacific's increase is $4,649,000, and the Burlington's $8,900,000. The increase for the three roads is therefore in excess of $18,000,000.

UNION PACIFIC.—This company has borrowed $10,000,000 through Kuhn, Loeb & Co., for 18 months, at 6 per cent. per annum. The money is for the use of the Southern Pacific, and collateral 5 per cent. notes have been issued on a 6 per cent. basis. Oregon Short Line 4 per cent. bonds to the amount of $13,500,000 have been pledged as collateral for the notes. It is stated that about one-half of the borrowed money comes from Europe.